THE IRON TRADE REVIEW

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CLEVELAND, OCTOBER 17, 1918

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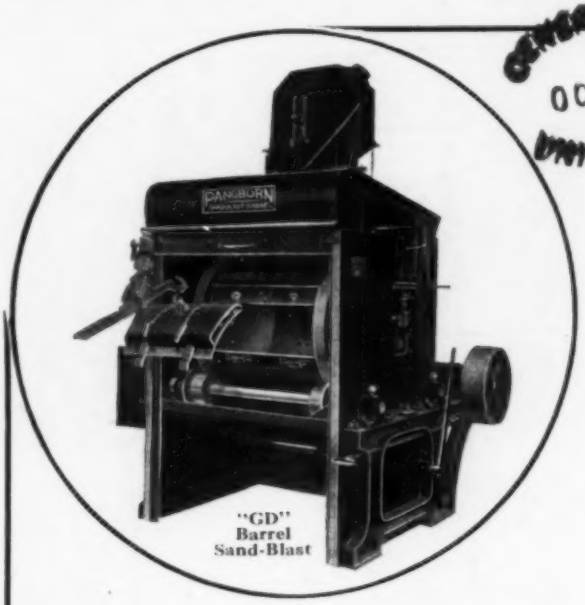

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2000 pounds Cored Brass Valve Bodies
Cleaned in This Barrel—1 operator in 1 hour

Problems of Scarcity and High Cost of Labor are Solved by These PANGBORN Automatic Dustless Sand-Blast Machines.

Prepare to cheerfully meet the next Draft, and help your Country by Keeping up your output and Conserving Man Power.

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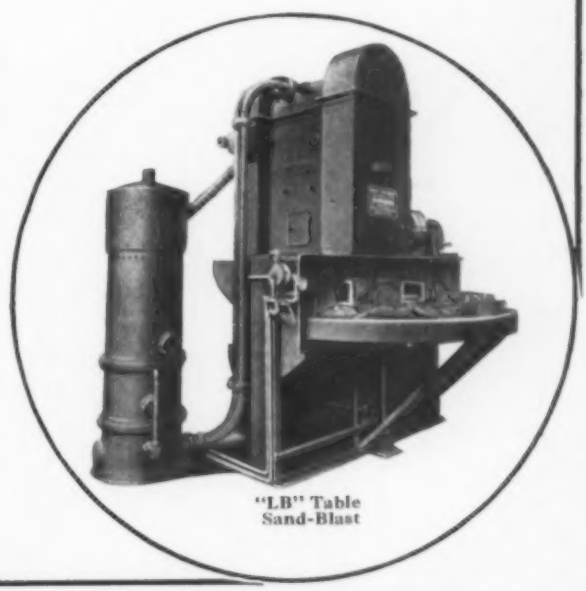

"LB" Table
Sand-Blast

Advertisers' Index, pages 178-179 Contents, page 876 (Editorial) "Where-to-Buy", page 100
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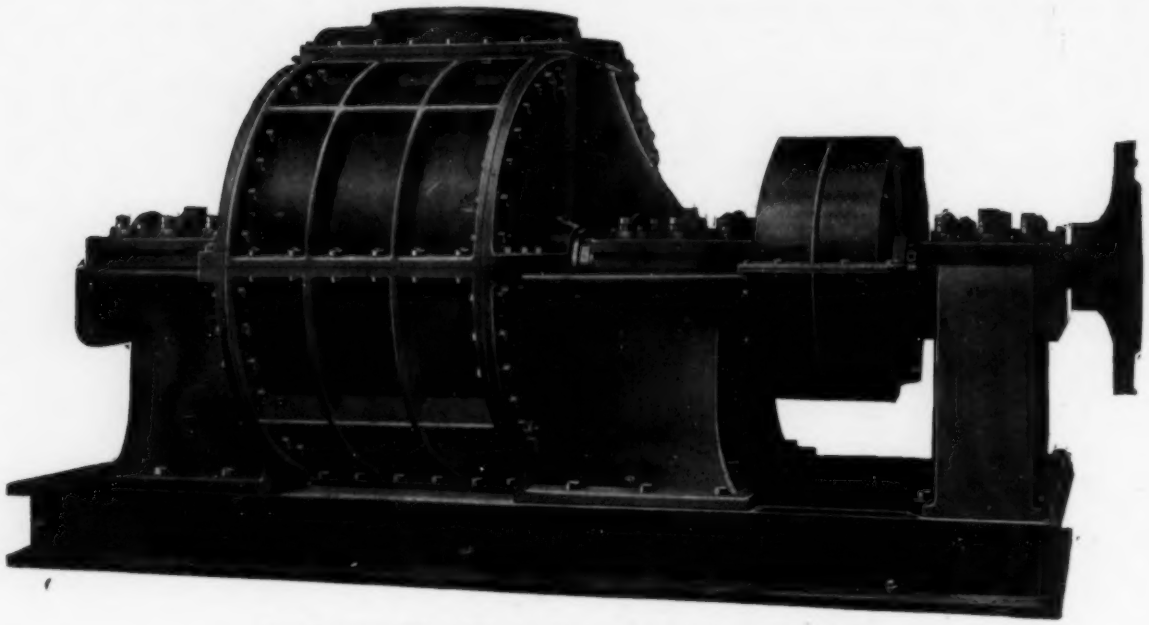

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Gas Pumps, Exhausters and Boosters

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Although they are the type of simplicity, they possess all the features of practical construction, resulting from years of experience.

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These pumps may be driven by belt, by direct connected steam engine, by electric motor direct connected or through gear and pinion, or by silent chain.

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CHICAGO
929 Monadnock Bldg.

CONNERSVILLE, IND.

NEW YORK
114 Liberty St.

THE IRON TRADE REVIEW

Vol. LXIII Cleveland, October 17, 1918 *No. 16*

Drive Hard for Military Victory

Iron and Steel Industry Backing Up, With Record-Breaking Production, President's Demand for Unconditional Surrender—Rushing Further Railroad Supplies to General Pershing—Greater Operating Efficiency Being Promoted

ATTUNED to President Wilson's demand for a peace based on a complete military decision, production of iron and steel for war requirements is going forward at top speed. The output of the mills and furnaces now more clearly reflects the intensive efforts put forth by the government and the manufacturers to surmount the obstacles that had been holding it back. October bids fair to uphold its traditional position as the year's banner month for operating results. Blast furnaces are running at a pace which if sustained will give the present month the largest tonnage of pig iron in the history of the country. Steelworks likewise have a good chance to establish a new high record. September's ingot statistics just put out show a rate of production equivalent to 45,500,000 tons annually. The daily average of the September output was the best since October, 1917. The performances of the finishing mills are equally good. Coke still supplies the one unsatisfactory side of the picture, as the unstability of labor apparently remains an effective deterrent.

Tie Mills To Plants

With general production on a high keel, plans nevertheless continue to be developed to better synchronize mill and furnace activities with war plant needs. Heads of mill order departments are meeting with the shipbuilders at Philadelphia this week to more closely determine the sequence of production and deliveries of steel so as to secure the best results in the yards. Along the same line, the movement to standardize steel sections for ships has taken further form. Apparently the ship problem at present is less one of tonnage than it is of a more exact adjustment of yard requirements to mill capacity to permit the most efficient operations at both ends. In shell steel, greater care is being exercised by the government to spread allocations so that all mills shall have on hand constantly a full 60 days order book.

Rush Steel To Pershing

New demands from General Pershing created by the allied advance continue to flow to the mills and these are being rushed ahead with all speed. Orders of this character just placed include 32,000 tons of 80-pound bessemer rails and 1500 locomotives. Bids have been taken on a new lot of 40,315 freight cars which is to be given precedence over all other overseas equipment requirements.

Modifications of the bar iron schedule have been announced by the American Iron and Steel institute. These provide for a new price of $5 per 100 pounds for refined bars and a cutting in two of the previous extras for size and quantity.

Poor Coke Is Factor

Since large production has been placed ahead of all other factors in pig iron, the inferior character of present coke supplies is having some effect on the quality of furnace output. Foundry iron production generally is running lower in silicon than consumers have been accustomed to receive with the result that there has been some modification of mixtures. Large demands for malleable iron are in sight, in connection with the semisteel shell program which is rapidly reaching a contracting stage. In the Pittsburgh district the furnaces are receiving large inquiries for the first half of 1919 from regular customers and as the latter are fully engaged in government work, it is likely some large purchases will be put through without allocation. In cases, furnaces have refused to fill allocations for certain consumers because the latter were shown to be in possession of liberal stocks. Merchant furnace interests have been following the lead of the steelworks in adopting the basic 8-hour day. The increase in production cost resulting thereby varies with the mechanical equipment.

OCTOBER 17, 1918

THE IRON TRADE REVIEW

A weekly publication devoted to the Iron, Steel, Foundry and Metal-working Industries

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A Meeting for War Business

IT was logical that patriotism should have dominated the thoughts and actions of the great Allied Metals Congress at Milwaukee at which the foundry industry of the country gathered for its annual deliberations. Loyalty to the country and to its hallowed cause in reality was the keynote of the entire convention. It showed itself in the enthusiastic reception accorded to the representatives of the French army who participated in one of the principal sessions; to the story of England's superb heroism and achievements as told by Major Dugmore; to the stirring message to American industry and manhood delivered by Mr. Schwab, and by innumerable other manifestations. The convention went vigorously on record with a message to the President urging that no conclusive or premature peace be given one moment's consideration and pledging the united efforts of the foundry industry to the furtherance of a complete military victory.

But the Milwaukee convention was notable in more respects than in its display of fervid enthusiasm for the national cause. It was essentially a business gathering and under the conditions of the time, one given peculiarly to practical patriotism. At the meeting, the program of the government which is to effect a wholesale utilization of the foundry capacity of the country for the making of cast shells formally was launched. Through this means the war service and the essential character of the foundry industry under present conditions is to be greatly enlarged. The interest being shown in the production of semisteel shells was displayed by the large attendance at the session where this subject was discussed by ordnance experts of both the American and French armies. On this occasion, as one speaker declared, more foundrymen were gathered in a single body than at any previous time in the world's history. Shop and technical problems, surrounding the production of parts and equipment for ships, trucks, aircraft, guns and innumerable other forms of war demand were reviewed and studied exhaustively. All thought was centered on questions of production and of quality with the underlying purpose of promoting greater and better service to the country in this period of vital dependence upon its industrial resources.

In these various ways, the Milwaukee convention contributed materially toward the solution of the problems of war industry. It was distinctly a convention with a mission of true war service to perform and it filled its part. Its influence will remain throughout the shops of the country. When the history of this war has been written, according to Mr. Schwab, the efforts of the iron and steel workers will have proved themselves of supreme importance in the great struggle. The spirit of the American foundryman so clearly displayed at Milwaukee makes it certain that when peace returns he will have proved himself a worthy recipient of the plaudits of a grateful nation.

Metal Conditions After the War

WITH the formation of the interallied pig tin pool and the appointment of the United States Steel Products Co. as an agency to direct distribution of tin among American consumers at prices to be fixed by the war industries board, tin has become forbidden ground for speculators and traders. It now is in the same category as copper, aluminum and lead, maximum prices on all of which metals have been fixed by the government and distribution directed by authorized bodies. The New York metal trade, whose activities at one time were intertwined with the distribution of millions of pounds of nonferrous metals to consumers all over this country, has been reduced to a shadow of its former prominence. By this statement is meant the brokers and dealers; producers of course are playing a vital part in supplying war needs.

Only spelter and antimony, of the better known nonferrous metals, remain a comparatively free market. Of spelter, much is bought by the govern-

ment acting for war industries, and other war industries themselves buy much metal direct from producers. In none of this work, of course, does the middleman figure. Antimony, while an important war metal and formerly highly speculative, is of comparatively litle importance from the standpoint of volume of business. Consequently, metal brokers and dealers are biding their time, waiting patiently for the end of the war.

But brokers are optimistic as to after the war prospects. The readjustment to peace conditions, accompanied by active searching for orders by many manufacturers, the return to commercial work of many war industries and the general industrial unsettlement will create, they expect, a great field for the exercise of their normal function, the sale of their services. Producers and consumers will need to be brought together as never before since old channels of trade will have been abruptly severed or dammed up by war conditions. This is, of course, purely the broker's view. As to the dealer, who buys and sells metals, and the speculator, the immediate prospects depend largely upon how long prices remain controlled and the manner in which the restrictions are removed. But, unquestionably, in the course of time, the metal markets will return to much the same as their prewar state, with one important exception. It is to be hoped the former baneful influence of German metal interests in the American and other metal markets of the world henceforth will be lacking. While the world is cleaning house in a political and moral sense, it should not overlook the insidious economic weapon which Germany used to spy upon the inner-domestic conditions of other countries.

War Stirs Creative Spirit

ONE result of the war and its heavy demands on the iron and steel industry for munitions and supplies will be to add greatly to the knowledge of most producers of these materials. In peace times too many manufacturers were content to proceed along well-defined lines which had been proved out, leaving pioneering to others who had a more venturesome spirit.

With the requirements for artillery supplies, demanding the closest adherence to specifications to prevent disaster in their use, foundrymen and others found their horizon enlarged and the necessity facing them of revising their practice and attempting work of much closer uniformity than most they had done before.

Ability to meet these exacting demands was no surprise to those familiar with American practice and the result has been that all over the land existing shops and organizations already in existence have adapted themselves to the new conditions and have supported the necessities of the government to the fullest degree.

A spirit of sportsmanship and emulation which is rife in America had much to do with this and every manufacturer and foundryman has been imbued with the desire to demonstrate his ability to advance and to meet new conditions brought on by the war. This is the spirit that will make America's assistance in winning the war, most effective. It is the spirit that evidently was not recognized as suspected by the powers that initiated the war.

Crowding the Coal Operators

BUFFETED on one side by the huge and insistent demands which the carrying forward of the war program of the country entails and on the other by insufficient, and to an extent inefficient, labor, the lot of the coal operator is not a happy one. Fixed prices, increasing labor costs, dwindling profits and rigid government inspections are among the other hardships that are his these days and probably will be for the duration of the war. Yet these and other burdens are borne with patience and in order that "freedom may not vanish from the earth" the coal mine owners are bending every effort to meet the demands put upon them.

It is open to question, however, if they are receiving the co-operation they are entitled to in this effort. For instance, it may be stated that there is inspection of shipments both at the mines and at receiving point. If the coal was good enough to be passed at point of origin and the quality can under no possibility change during transit, why should inspection at destination be necessary? This means duplication of effort in the first place, but a far more important development in case of rejection at receiving point, is the demurrage charge that falls on the shipper, not to mention the tieing up of the cars longer than would otherwise be necessary.

Demurrage charges pile up pretty rapidly between the time of rejection, the notification of the shipper and the reassigning of the coal, turned down. Inspection of the coal at the mines would seem sufficient. Since the government has undertaken the inspection, it should be strictly up to the former to make this mine inspection so rigid as to render unnecessary any further examination.

Mine inspection of the right sort which would be final would be co-operation to which the coal operator is entitled. And the fuel administration also could help by a little more thorough inquiry as to the best uses of the coals of the different mines. Some are specially suited for heating, while others are best adapted for coke. There should be no shipping of coking coke where merely heating fuel is required, or vice versa.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 932.

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.60
Basic, Valley	33.00
Basic, Pittsburgh	34.40
Basic, del. Eastern Pa.	36.60
Basic, Buffalo, furnace	33.00
Malleable, Valley, del. Pittsburgh	35.90
Malleable, Chicago, furnace	34.50
Malleable, Buffalo, furnace	34.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $34 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus $1.25.

2.75 to 3.25 silicon (No. IX), base plus $3.00.

Over 3.25 silicon, $37.00, plus $1.00 for each ½ per cent of silicon.

No. 1X, delivered Philadelphia	40.60
No. 2 foundry, Pittsburgh	35.40
No. 2 foundry, Cleveland furnace	34.00
No. 2 foundry, Ironton furnace	34.00
No. 1 foundry, Chicago furnace	35.25
No. 2 foundry, Chicago	34.00
No. 2X foundry, Phila.	38.85
No. 2X foundry, N. J. tide	39.05
No. 2X foundry, Buffalo furnace	35.25
No. 2 plain Philadelphia	37.60
No. 2 plain, N. J. tide	37.80
No. 2 southern, Birmingham	35.25
No. 2 southern, Cincinnati	38.85
No. 2 southern, Chicago	40.25
No. 2 southern, Phila.	41.85
No. 2 southern, Cleveland	40.25
No. 2 southern, Boston	42.75
No. 2 southern, St. Louis	39.50
Virginia, No. 2X, furnace	37.50 to 38.50
Virginia, No. 2X, Phila.	41.85
Virginia, No. 2X, Jersey City	42.75
Virginia, No. 2X, Boston	42.95
Gray Forge, Valley, del. Pittsburgh	34.40
Silveries, 8 per cent, furnace	47.50
Silveries, 8 per cent, Chicago	51.50
Low phos. standard, Phila.	57.00
Low phos. Lebanon, furnace	51.00 to 53.00
Low phos. Pittsburgh standard	54.40
Charcoal, Superior, Chicago	38.70 to 39.00
Charcoal, Superior, Buffalo	38.50
Charcoal, southern to 2 per cent silicon	51.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	8.00
Wise county furnace	7.25
Wise county foundry	8.25

FERROALLOYS

Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot	75.00
Spiegel, contracts, furnace	75.00
Ferrocarbon, titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, spot and contract, delivered	150.00 to 160.00
Bessemer ferrosilicon, 10 per cent	57.00
Bessemer ferrosilicon, 11 per cent	60.30
Bessemer ferrosilicon, 12 per cent	63.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS AND BLOOMS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	51.30
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.80

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

SLABS

Pittsburgh and Youngstown	$50.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.50
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.23c
Structural shapes, N. Y.	3.245c
Structural shapes, Chgo.	3.27c
Tank plates, Chicago	3.52c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.48c
Tank plates, New York	3.495c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	3.17c
Bars, soft steel, New York	3.115c
Bars, soft steel, Phila.	3.13c
Bar iron, common, Phila.	3.73c
Bar iron, common, Chicago	3.50c
Bar iron, common, Cleveland	3.67c
Bar iron, common, New York	3.745c
Bar iron, common, Pittsburgh	3.50c
Bar iron, refined, Pittsburgh	5.00c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	5.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, 1 in. proof coil, Pitts.	7.50c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.27c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.52c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.52c
No. 10, open-hearth, Phila.	4.48c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

	Black Per cent off	Galv. Per cent off
⅜ to 3 in., butt, steel	51	37½
¾ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

Without War Freight Tax

(Class B Pipe)

Class A pipe is $1 higher than Class B.

Four-inch, Chicago	69.80
Six-inch and over, Chicago	66.80
Four-inch, New York	70.70
Six-inch and over, N. Y.	67.70
Four-inch, Birmingham	63.00
Six-inch and over, Birmingham	60.00

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	3.50c
Hot rolled strip steel, Pitts.	3.50c
Hot rolled strip steel, Pitts. stamping quality	4.00c
Shafting, Pitts., carloads	17 off to list
Cotton ties, Oct., per bundle	$1.96

RIVETS

Structural rivets, Pittsburgh	4.40c
Boiler rivets, Pittsburgh	4.50c
Rivets 7/16 in. and small., Pitts.	50 and 10 off

NUTS AND BOLTS

(Prices f. o. b. Pittsburgh)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50-5 off
Cut thread	40-10-5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50-10-5 off
Cut thread	50-5 off
Larger and longer	40-10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60-10-10 off
Cold pressed semifinished hexagon nuts ⅝ in. and smaller	70-5 off
Gimlet and cone point lag screws	50-10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products October 16, average for September, 1918, average for July, 1918, and average for October, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Oct. 16, 1918	Average prices Sept. 1918	July 1918	Oct. 1917
Bessemer pig iron, Pittsburgh	$ 36.60	$36.60	$36.60	$37.25
Basic pig iron, Pittsburgh	34.40	33.40	33.40	33.95
*No. 2 Foundry pig iron, Pittsburgh	35.40	34.40	34.40	33.95
*No. 2 Foundry pig iron, Chicago	34.00	33.00	33.00	33.00
Lake Superior charcoal, Chicago	38.70	37.70	37.50	37.50
Malleable, valley	34.50	34.90	34.90	35.20
Malleable, Chicago	34.50	33.50	33.50	33.50
**Southern, No. 2, Birmingham	35.25	33.50	33.50	33.00
*Southern Ohio No. 2, Ironton	34.00	33.00	33.00	33.00
Basic, eastern Pa.	36.60	32.00	32.00	33.00
**No. 2X Virginia, furnace	38.00	33.50	33.50	33.50
**No. 2X foundry, Philadelphia	38.85	34.50	34.50	34.25
Ferromanganese, 70%, delivered	250.00	250.00	250.00	285.00
Bessemer billets, Pittsburgh	47.50	47.50	47.50	58.75
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	65.50
Open-hearth sheet bars, Pittsburgh	51.00	51.00	51.00	65.50
Open-hearth billets, Pittsburgh	47.50	47.50	47.50	58.75
Steel bars, Pittsburgh	2.90	2.90	2.90	2.90
Steel bars, Chicago	3.17	3.17	3.17	2.90
Iron bars, Philadelphia	3.73	3.73	3.73	4.935

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices Oct. 16, 1918	Average prices Sept. 1918	July 1918	Oct. 1917
Iron bars, Cleveland	$ 3.64	$ 3.64	$ 3.64	$ 4.50
Iron bars, Chicago mill	3.50	3.50	3.50	4.50
Beams, Chicago	3.27	3.27	3.27	3.00
Beams, Pittsburgh	3.00	3.00	3.00	3.00
Beams, Philadelphia	3.23	3.23	3.23	3.185
Tank plates, Pittsburgh	3.25	3.25	3.25	3.25
Tank plates, Chicago	3.52	3.52	3.52	3.25
Tank plates, Philadelphia	3.48	3.48	3.48	3.435
Sheets, blk., No. 28, Pittsburgh	5.00	5.00	5.00	7.75
Sheets, blue anld., No. 10, Pittsburgh	4.25	4.25	4.25	7.87
Sheets, galv., No. 28, Pittsburgh	6.25	6.25	6.25	8.81
Wire nails, Pittsburgh	3.50	3.50	3.50	3.87
Connellsville furnace coke	6.00	6.00	6.00	6.00
Connellsville foundry coke	7.00	7.00	7.00	6.00
Heavy melting steel, Pittsburgh	29.00	29.00	29.00	31.50
Heavy melting steel, eastern Pa.	28.50	28.50	28.50	26.00
Heavy melting steel, Chicago	29.00	29.00	29.00	27.00
No. 1 wrought, eastern Pa.	34.00	34.00	34.00	36.75
No. 1 wrought, Chicago	33.50	33.50	33.50	35.50
Rerolling rails, Chicago	34.00	34.00	34.00	36.00

(FOR ADDITIONAL PRICES SEE PAGE 932.)

Entertain Big First Half Inquiry

Steel Manufacturers in Pittsburgh District Arranging to Buy Direct From Furnaces Without Allocation— Inferior Coke Affects Silicon Content of Product— Bessemer Stacks to be Switched to Basic

Pittsburgh, Oct. 15.—Surface indications are suggestive of extreme quietness in the pig iron market here, but to some extent such appearances are misleading. Non self-contained steel manufacturers are figuring out their needs for the first half of 1919 and some have actually put out the inquiries for their requirements for this period. The inquiries have been placed with the regular sources of supply and these sources, it might be stated, are not, contrary to the recent practice, directing the inquirers to Washington. If the interests who have had the inquiries had not long supplied these consumers and did not know that the iron is sought for 100 per cent government work, it is probable that no attention would be paid to them. The war industries board has not said in so many words that the blast furnace interests must not contract ahead but such is believed by most of the trade to be the unwritten wishes of the authorities. Some makers of iron, however, believe that to accept advance business from plants known to be fully employed on essential government work would not defeat even the spirit of the desire of the war industries board; on the contrary, they argue that such a course must be a help to that body in relieving it of some of the details attendant upon allocations. It will be interesting to note how Washington regards any business that may be done direct as a result of these inquiries. Most blast furnace interests are disinclined to consider inquiries regardless of the source, for acceptance involves the responsibility of making it certain the buyer is doing war work exclusively and is entitled to the iron. This responsibility most makers are inclined to pass on to Washington. Allocations of iron in this district have been few and small lately. Indications still are strong that another record in the matter of production will be established this month. Thanks to the close cooperation between the railroad, fuel and labor administrations, the blast furnaces now suffer for nothing that will assist operation and production. Improvement in the quality of coke provided is one result of the cooperative spirit at the capital and the increase in the tonnage of pig iron is in no small measure due to improved fuel. Much interest is noted in the probable increase in the cost of producing pig iron as a result of the inauguration of the basic 8-hour day at the blast furnaces. Actual figures of course will not be available until the payrolls and tonnages for the month are available, but current estimates run anywhere from 15 to 75 cents a ton. The higher figure is at furnaces where there is much hand labor; since there are comparatively few such plants in this district, the labor increase probably will not average much more than 25 to 30 cents a ton. In allocations, the war industries board has control over distribution of off grades as well as standard quality iron, is the understanding of the trade here.

Expect Big Malleable Orders

Buffalo, Oct. 15.—Allocating is going on steadily in the Buffalo pig iron market and taking practically the entire capacity of furnaces. One furnaceman estimated government requirements at 98 per cent; another said it was 100 per cent at his plant. It is so great, in any event, that nothing but an occasional carload here and there is sold which is not allocated, and interests make very sure before allowing this car to get out that it is intended for government purposes. Local interests are endeavoring to put their plants in a position to take care of heavy malleable allocations to come. It has been intimated by the government that it will have heavy malleable requirements in the near future and that it will ask furnace interests to assume as much obligation along this line as they possibly can. It is believed that the government wants all the malleable furnaces can turn out between now and spring. It is not stated what the government wants the malle-

able for, but furnaces are exercising care to obtain as much low phosphorus ore as possible. The production of malleable here is low at this time.

Furnaces Out for Repairs

New York, Oct. 14.—Numerous additional tonnages of foundry and low-phosphorus iron have been allocated in this district during the past week, for shipment principally over the first half of next year. Outside of such allocations, the market has been practically devoid of business. Rumors continue to be heard to the effect that some furnaces now engaged in the manufacture of ferromanganese and spiegeleisen shortly will be put over on basic, but no definite decision yet has been reached on this point. Among furnaces which now are idle is that of the Northern Ore Co. at Easton, Pa. The stoves of this furnace, which was engaged in the production of bessemer, are to be rebuilt in order to increase the tonnage output. Carbon, which is out for relining, is expected to resume production of foundry the latter part of October.

All Rail Rate Rules

Philadelphia, Oct. 16.—Pig iron consumers in Camden and other points have raised the question whether or not they should receive Virginia iron on rail and water or on all rail rates from Birmingham. This question has been referred by Virginia furnaces to the war industries board, to Chairman H. G. Dalton of the committee on pig iron, iron ore and lake transportation. The latter has issued the following ruling: "The official all rail freight rate in effect from Birmingham to point of destination on any sales of Virginia iron that may be made to you shall govern." The question of shifting furnaces from ferromanganese and spiegeleisen to pig iron it is now believed will solve itself since the present output of the manganese materials is greater than the demand. It is considered unlikely in well informed circles that many furnaces will continue to be shifted from foundry to basic in this territory since foundry iron is in much demand for essential purposes. It is believed, however, that there will continue to be considerable changing over from bessemer to basic as the bessemer supply is plentiful. Allocations of low phosphorus iron continues, but these make a smaller total than previously.

Silicons Running Lower

Cleveland, Oct. 15.—Efforts to speed up and hold production of pig iron at a high point, coupled with the inferior character of the coke being received by the furnaces, are having an important effect upon the quality of output. Furnaces in this district are having more difficulty under these conditions in producing their accustomed grades and the silicons generally are running lower. Most of the foundry iron now being made is of 2 per cent or less silicon. As high production is regarded as of greater importance than high silicon, various consumers are being obliged to accept iron of a lower character than usually they would like. The loss of silicon is being made up by a more liberal use of silveries and the special silicon grades. Producing conditions continue more favorable and the record reported by various furnaces is in excess of the high showing for September. An Ohio producer will supply 12,500 tons of 14 per cent bessemer ferrosilicon, of which 10,500 tons is for delivery in the first half. This iron is for special government work and its allocation was arranged for during the week. The total allocations by the committee on pig iron, iron ore and lake transportation during the week were slightly over 40,000 tons and include 15,600 tons of bessemer, 8300 tons of foundry, 2500 tons of low phosphorus, of which 2100 tons was for first half, 700 tons of bessemer and 700 tons of silveries. The total of iron allocated since May 1 now is 1,227,000 tons. A heavy tonnage of new requests is before the committee for action during the coming week. In some cases producers have declined to fill allocations for certain customers because the latest questionnaires returned by the latter had shown them to have a liberal stock on hand.

Market Devoid of Feature

Chicago, Oct. 15.—Absolute lack of feature in the pig iron market defines the present situation. Makers are unable to sell further for delivery this year and all iron needed for war work before Jan. 1 is obtained only by allocation. Some inquiry is current, both for this year and for first half of next year. On the former no action is possible and on the latter contracts are being booked when desired, though this is regarded as a mere formality. Selling for 1919 has been going on by northern makers for some weeks but the total tonnage thus closed is not large. Many melters believe it is not necessary to resort to contracts to cover their requirements for next year and are remaining out of the market. One producer which has a small tonnage available for sale is finding difficulty in keeping his sulphur down and thus provides some off iron. This is being taken by foundries which have found a way to use it in their mixtures. This relieves the demand for prompt iron to a small degree. Most melters are able to continue operation on present supplies and deliveries, though occasional instances have occurred where plants have had to close for short periods. Southern makers are not entertaining inquiries from this district, allocations being sufficient to more than cover their available production. Some makers of semisteel shells have sounded the market for immediate supplies but have not been able to cover fully and are seeking allocations to provide material for their munition programs.

Offerings Quickly Taken

Cincinnati, Oct. 14.—The average melter seemingly has been willing to drift along with the tide and fewer inquiries have been issued. However, when any iron is offered it is taken promptly. Lately only a limited tonnage of high sulphur iron could be had but occasionally some standard iron is put out that is quickly absorbed. These offers of iron are from furnaces which have something left over and they are so few and far between that they are hardly worth mentioning. The plain facts are that there is such a shortage of iron that consumers, even in the essential lines, are somewhat apprehensive about the future. It is not denied that production is probably above any previous record but iron merchants reverse the chart and show that consumption is fast eating into any small reserve stocks that may be held by all melters. These stocks, whether of iron for steelmaking purposes or for the foundries, it is said, are being drawn on more heavily than is generally realized. The labor shortage in all industries is as serious as ever, but it is probably more acute at the consuming than at the producing end. This would indicate that the melters are getting better service from their men than the producers.

Off Iron Snapped Up

St. Louis, Oct. 12.—The demand for all grades of pig iron continues to hold up excellently well, and on the whole the week has developed little change in the situation. About the only thing out of the usual routine was the sale by a leading southern producer of between 3000 and 4000 tons of off iron. This iron graded No. 4 foundry, and was snapped up immediately upon being offered. Sales of smaller amounts by other Birmingham furnace interests were also reported but the total volume of this business served very meagerly to slake the great demand in this district. In addition to this off iron, some of the nonessential plants have received small deliveries, mainly on contracts covering the first half of this year, so that momentarily things look less uncertain. Another element to lift the spirits of the nonwar consumers has been the gradual obtaining of war contracts. These while not of impressive size, will materially aid in keeping together organizations. On the other hand, it is admitted by a number of large nonwar plants that they are dangerously near the end of their resources. Both selling agencies and producers are addressing themselves chiefly to government allocations. None has anything to sell outside of what has been assigned through the steel director. This is particularly true of producers of basic as all who serve this region are sold far into next year. Deliveries to war industries continue satisfactory and virtually all essential plants are operating at or near full capacity.

Flu May Affect Output

Birmingham, Ala., Oct. 15.—Unless there is a change for the better at once, there is probability that the influenza epidemic, which reached this section the first part of the past week in force will affect pig iron production. It was announced three days after health committees had taken hold of the situation, shutting down on all gatherings and amusements, that the coal mining camps were feeling the effects of the epidemic and these have spread to the ore mines, to the transportation companies and even to the furnace operations. Despite efforts to increase the output of iron, production figures show a reduction. There is no new business other than the allocated orders from the govern-

ment. The Woodward Iron Co. will rush repairs on the little Vanderbilt furnace so that operations can be resumed the latter part of month. The Sloss-Sheffield Steel & Iron Co. and the Alabama Co. will not start up for a while their furnaces now in readiness. Inquiries continue to appear freely and regular customers are appealing for iron. Some shipments are being made on old orders. Unless there is decided improvement in the make during the last half of the month, the October output at furnaces in Alabama will be under the 207,345 tons, reported for September.

Lower Level

Reached by Sheet Production In September—Export Allocations Made

Pittsburgh, Oct. 15.—Operations of the sheet mills for September, figures lately available confirm fully the low estimates current during that month. Because of the steadily tapering supply of sheet bars, due to the diversion of steel to other finishing mills, production of sheets declined steadily throughout the month and the total output was the lowest of any month this year. Further contraction has occurred since in the bar supply and the current month promises to make an even poorer showing than did September. Government orders have not been heavier since the country entered the war than they are now and as a fitting answer to the kaiser's peace proposal and in refutation of the idea that peace is at hand, it might be stated that within a week allocations involving a considerable tonnage for export have been distributed. An idea of the shortage of sheet bars may be gleaned from the fact that they are just about sufficient and no more than sufficient to meet government requirements of sheets. Almost nothing is available for shipment against priorities lower than AA and A ratings.

May Curtail Sheets

Chicago, Oct. 15.—Although an independent sheetmaker in this district continues to operate at about 60 per cent of capacity, this rate may be curtailed if demand for plates and shell bars absorb a larger proportion of ingots. Sheets are on a much lower priority basis than most other steel products and must take a secondary position where there is not sufficient steel for all purposes.

Production Kept Down

Youngstown, O., Oct. 16.—Scarcity of sheet bars continues to be the main hindrance in holding down the sheet production in the valley. Makers of sheets are fairly well booked with high-rated priority orders but mills lately have been operating at such reduced capacity that shipment of these orders are long overdue. Jobbers are getting a small tonnage now and then but in most cases where their requirements are fairly large, the best they can do is to get their orders on the books.

The Lackawanna Bridge Co. has booked 100 tons of structural steel for the Atlas Crucible Steel Co., Dunkirk, N. Y.

Coke Output Hanging Back

Quality Steadily Improves But Not Production—Car Supply Ample But Labor Remains the Uncertain Factor

Pittsburgh, Oct. 15.—Complaint of merchant blast furnaces is no longer of quality but of quantity. Sustained improvement in the quality is noted, but this result has been attained only by extraordinary care in its preparation and there has been, in consequence, a considerable contraction in the supply. Coal production is making a good showing and the steel companies operating by-product ovens are not suffering badly for fuel for their blast furnaces. At the same time, it is noted that there has been no increase in the number of batteries of the Clairton plant of the Carnegie Steel Co. in blast, notwithstanding the putting out of some 1400 ovens of the H. C. Frick Coke Co. at Connellsville and the diversion of the coal to the Clairton plant. It is the merchant blast furnace interests who have most to worry about concerning the coke supply. That there will be car shortages even remotely approaching those of a year ago is doubtful, for railroad equipment, both in cars and motive power, has been materially increased, but these interests will not breathe easy until there has been some development to interfere with the normal operation of the railroads and they see how quickly there is a recovery from the interruption. Car supplies in the Connellsville region are 100 per cent, as they have been for the past two months. Production of coke in the Connellsville region for the week ended Sept. 28, was 330,160 tons, compared with 335,195 tons in the previous week, a gain in the output of the merchant ovens being more than counterbalanced by a loss in the furnace oven production, according to the *Connellsville Courier*.

Movement Is Prompt

Cincinnati, Oct. 14.—It has been some time since any complaints have been made by foundrymen, all of whom are now well supplied. Although attempts are made to stock up for winter needs, these have only been partially successful as considerable Pocahontas and New River coke that was formerly shipped to this territory is being diverted to other places where it is most urgently needed. Occasionally some spot foundry coke can be had but contracting for future shipment is said by a responsible authority, to be at a standstill. In the opinion of well-informed persons, it is difficult for them to see when coke will resume its customary place, no matter how long or short the war may be. An item of especial interest is that coke is being moved very promptly.

First Half Fuel Wanted

St. Louis, Oct. 12.—The coke situation in this district has developed no change worthy of note. There was some complaint of a slowing down in deliveries from eastern ovens, but in the main war plants are receiving regular supplies of fair quality. There was an inquiry for 5000 tons of foundry from a southwestern plant for delivery through the first half of next year, and several from lesser quantities from the same region, but only small parts of the total tonnage desired has been contracted for. Dealers are contracting with regular customers for next year strictly on a basis of this season's actual consumption, but so far as can be learned additional wants are not being supplied unless backed by the highest classification. Production by the by-product ovens in the district are on a large scale. Coal shipments are coming along with excellent regularity, and as contrasted with other industries labor is fairly satisfactory. The extensive use of colored laborers, both men and women, has helped out materially. No free coke is being offered, however, and nonessential users are experiencing difficulty in obtaining adequate supplies even for curtailed operations.

Pushing Coal Production

Birmingham, Ala., Oct. 15.—Coal production in Alabama for the first two weeks in October showed an increase as compared with four and six previous weeks. Fear is held that the present week will show a falling off again by reason of the influenza epidemic. Federal administration figures for the week ending Oct. 5 show an output at Alabama mines of 409,022 tons. Every employee is being urged to give best effort in producing coal. Mines on the Warrior river, producing bunker coal and with the water transportation the only means of reaching the market, are now moving between 400 and 600 tons daily. Railroad cars are just as much in demand as before for bunker and high class coal.

Tin Plate Needs

Are Laid Out By War Industries Board—Operations Decline

Pittsburgh, Oct. 15.—Tin plate requirements of the packers of perishable foods have been filled and makers are now running on the needs for dry foods and general lines. Actual information as to these latter requirements are not known yet, for while it is understood that there has been agreement between the war industries board and makers of the different kinds of containers as to the amount of tin plate the latter are to have, no official pronouncement on the subject has come out yet. Announcement of the amounts of tin plate to be allowed for each purpose together with the method to be pursued in distribution and policing of supplies is expected shortly. Sufficient supplies of tin bars to permit of 70 per cent operation of the mills are available, but current running of the plants is under rather than at or above the prescribed mark.

To Bring in Panama Scrap

Committee Arranges to Ship 40,000 Tons of Steel and Cast—Peace Talk Has Effect on Market—Supplies Still Scant

FOR COMPLETE SCRAP PRICES SEE PAGE 932.

Philadelphia, Oct. 15.—Approximately 40,000 tons of Panama scrap will be brought to this country under arrangements just made by the subcommittee on scrap of the American Iron and Steel institute. This material consists mainly of heavy melting steel and cast. The steel will go to eastern Pennsylvania mills and the cast scrap to the Pacific coast. Great difficulty continues to be encountered in locating sufficient heavy melting steel to fill the demands. Central Ohio mills particularly are in need Some eastern plate mills are consuming their own scrap which on the market would bring $39 delivered, because they cannot get sufficient steel at $29 delivered. The subcommittee prefers to see this steel sold, but the general lack of melting steel makes it impossible to bring much pressure to bear. In one case where a works is keeping all its plate scrap despite the fact that the subcommittee is supplying it with heavy melting steel, the latter declines to render further aid. With the exception of plate material, the supply of low phosphorus scrap is larger than for some months.

All Offerings Are Taken

New York, Oct. 14.—While conjecture prevails in the New York scrap market over the possibility of an early peace, no reflection whatsoever of present international developments is seen in the general trend of trading. Mills continue to take all material offered, and dealers still have difficulty moving supplies fast enough. Shipments of clean cast borings and turnings to rolling mills at the advance of $2 have now practically ceased. The situation generally, however, is devoid of new features, with prices holding firm at the government maximum.

No Softening in Prices

Pittsburgh, Oct. 15.—Reports of an easier market for scrap in some outside markets, induced, no doubt, by the possibility of peace, find no reflection here. On the contrary, the market is firm, with prices on almost all grades at or near government maximums, as the demand is urgent and the supply inadequate. Heavy production of shells has resulted in fairly liberal offerings of turnings, but the market is easier only to the extent that it is simpler to find supplies than was the case a short time ago. Business continues to be done on a basis of $24, delivered, plus commission, for heavy turnings and at $19 for the light offerings; the latter are not much wanted, as it is found they are more expensive to handle than heavy turnings. Dealers continue to complain of the great difficulty experienced in picking up supplies. Suggestions that there are generous tonnages in the agricultural regions are not viewed as a possible means of relief. It is argued that the farmers are too busy hauling their crops to spare the time and equipment for bringing their junk to shipping points. The province of the dealers has become quite restricted and commissions are now the only source of income, save on relaying rails and some one or two other grades on which prices have not been fixed. In inverse ratio to former practice, dealers now have to secure supplies before seeking customers Speculation is dead, for with prices fixed, chances for profits by being long on the market are slight.

Supplied For the Winter

Buffalo, Oct. 15.—Scrap of all kinds continues scarce in this locality with consumers making every effort to secure lots where possible. Most mills are in the position of having about what they figure will take them through the winter, but no more. All of them would willingly take on more tonnages, but the material is not available in the lots they would like. Labor troubles continue in the yards, adding to the difficulties of the situation. Yards find it exceptionally hard to keep their help in view of the war-plants competition. Dealers say that the outlook for the winter is frankly bad but it is realized that the work of the subcommittee on iron and steel scrap may be able to assist plants which are in especially grave need of supplies. The cheaper grades of scrap remain at their new price of a week ago and the better grades hold firm. The Liberty Iron & Steel Corp. has been formed by Buffalo scrap iron men and has entered into a contract with the Symington-Chicago Co. of Chicago to take the 400 or 500 tons of shell ends and turnings which this plant produces daily.

Wait On Peace Parley

Cleveland, Oct. 15.—Talk of peace in Europe is having a decidedly bearish effect on trading in the scrap iron and steel market here. Dealers and consumers alike are exhibiting a tendency toward waiting and seeing what the exchange of notes brings forth. Dealers point to the fact that probably 40 per cent of the business on their books deal with contracts that should have been shipped out by July 1. Consequently, conclusion of the war will mean abrogation of these contracts—a thing which the dealers cannot protest—and will compel them to market considerable scrap at the best prices obtainable. Few dealers believe the government will step in and interfere with contracts, inasmuch as price-fixing so far has not involved the abrogation of buying and selling agreements. Even the most optimistic dealers hold it will take six to eight months for the readjustment. Meanwhile, prices still are quoted at the government maximum, as a rule, and the standard grades are moving to consumers in fair consignments.

Labor Shortage Hurts

Chicago, Oct. 15.—Lack of labor in scrap yards is having a decided effect in buying and many yards are confining their purchases to grades which require little or no preparation. Material requiring cutting is difficult to sell. Boilers and tanks which require the use of a gas flame for cutting up are a drug on the market and will not be sought until further supplies of gas can be obtained. This situation is bringing about some changes in the general relation of various scrap grades. The Union Pacific is offering a list containing 2660 tons.

Supply Not More Plentiful

Cincinnati, Oct. 14.—Reports that the supply of scrap is on the increase in other markets are totally at variance with conditions existing here. While there has been no sudden demand on yard stocks in this vicinity, nevertheless, they are being drawn on in excess of receipts from different sources. The foundries have been taking all the suitable scrap they can find but dealers are not very keen to make contracts very far ahead. The fact that government prices will govern in all transactions does not seem to retard business as much as the uncertainty of a future supply. The railroads are delivering a much smaller tonnage of scrap to local dealers than for some time past and receipts from other sources also are somewhat curtailed. Stove plate is in much better demand and borings and turnings also are wanted, mostly by outside melters. The dealers have not yet secured the maximum allowed on cast borings and steel turnings, although prices have been stiffened by permission to charge $21 per gross ton delivered to some consumers in the Pittsburgh district

Peace Talk Uncertain Factor

St. Louis, Oct. 12.—The spurt of activity which marked the opening week of this month in scrap iron and steel quickly ran its brief course, and things have subsided into relative quietness. Yard men and small dealers generally are showing less disposition to dispose of their stocks, and the feeling is considerably less bearish, though no changes have been made in prices. The rush to sell noted the week before has been curbed. It is quite manifest that the tip has gone forth among smaller scrap producers, collectors and dealers that signs of peace are a signal to unload. A strengthening factor in the situation is the readiness with which steel interests in this district are taking anything offered in the way of steel scrap. This material is bringing maximum prices, or close to them, plus commissions. On the other hand the main foundry interest continues out of the market, and to all appearances has all it requires at this time. Rolling mills are disposed to hold back. The peace talk is a decidedly disturbing factor in the situation, both buyers and sellers feeling uncertain and displaying more caution than heretofore. Steel continues scarce, and in good demand. Several inquiries have been received for relaying rails for export. No scrap to speak of is coming from

the country. A fair volume of turnings and borings has developed but it has been quickly disposed of. The Wabash issued a list of 1150 tons but though there were bids enough did not close, instructions having been received from the government to hold it up. The only other railroad offering before the market this week was 125 tons from the Missouri, Kansas and Texas.

Southern Market Stronger

Birmingham, Ala., Oct. 15.—The southern scrap iron and steel market is considered fairly good now, somewhat stronger than it has been. A number of contracts are in hand and an effort is being made to fill these steadily. Labor is scarce and as a consequence the yards stocks are likely to show a decline soon. No trouble is reported by dealers in finding plenty of country scrap, which if assorted would give a good supply for various purposes. Local demand is active in all sections. Quotations remain about as they have been for the past three weeks with the dealers holding out strongly for the asking figures.

American Steel Men Meet With British Institute

The autumn meeting of the Iron and Steel institute which assembled at the Institution of Civil Engineers, London, on Sept. 12 and 13 was, for the season, exceptionally interesting and successful. About 150 members attended, including a number in khaki. A contingent of well known American metallurgists, was present and as their visit happened to coincide with the first real offensive of the American army in the Metz area, they were warmly received. A similar tribute was paid to the president of the institute, Eugene Schneider of Paris on the recent military achievements of his countrymen.

Last year the institute decided to exclude enemy aliens from membership. This entailed a loss of about 120 members. But the membership has been more than made up by the largest accession during the past 20 years, and there is still a good margin of 50, after allowing for the alien deletions. Nearly 100 candidates for admission were announced, including a first contingent of several ladies, all of whom were elected on ballot. The American guests at the meeting were Dr. J. S. Unger of the central research bureau, Pittsburgh, and J. Hulst and C. A. Muller of the United States Steel Corp. These men are visiting Great Britain, France and Italy on a special mission. With them was Capt. J. H. Nead, of the United States ordnance department, who before the war was metallurgical engineer to the Minneapolis Steel & Machinery Co.

The only formal business was the announcement that the retiring members of council, vice presidents, etc., would be open for re-election next May. An interesting program of papers and discussion was presented.

The Canadian Pacific's gross earnings for the first week of October were $3,458,000, an incrase of $616,000.

Steel Middlemen Missed

Producers of Off-Heats Encounter Difficulty in Reaching Buyers —Sheet Bar Supply on Minimum Basis

Pittsburgh, Oct. 15.—Elimination of brokers in transactions in semifinished steel is largely a fact, but this does not mean that there are not producers who could find a use for such services. Some who usually distributed tonnages of steel off in some respect through middlemen are understood to be floundering around for a means of disposing of it direct and have even approached brokers to act as agents in bringing them in touch with prospective buyers. A belief that such a course would be a violation of the spirit if not the letter of the ruling, however, has prevented those sought from accepting the opportunities. Too great a demand exists for shell steel and rails for much of a supply of billets becoming available and the continued diversion of steel to those purposes also is affecting to a large extent the supply of sheet bars. Actually, the sheet mills are getting just about enough bars to take care of direct government orders and nothing else. Restrictions in plate output have brought about no increase in offerings of slabs.

Off Heats Offered

Philadelphia, Oct. 15.—Semifinished offerings in this territory include several hundred tons of off heat forging billets by a western mill. Occasional tonnages of shell steel discard billets continue to be sold.

Filled By Allocations

Buffalo, Oct. 15.—One mill which has just received more allocations for billets and ingots for government work, says that it is covered for four or five months ahead on this material.

Gun Steel Is Placed

Cleveland, Oct. 15.—For an additional order for naval guns, placed with a builder in this district last week, 6000 tons of alloy steel now has been practically placed with a Pittsburgh producer. Some vanadium spring steel for the 25,000 army trucks about to be distributed as previously stated, also is being placed. The distribution for the truck order is still to be made.

Cannot Get the Steel

Pittsburgh, Oct. 15.—Shortage of steel continues to restrict the output of cold and hot rolled strip steel, especially of those manufacturers who are not self-contained. It seems that as a recent ruling by the war industries board, a priority is good for one step; that is, the company dependent on outside concerns for steel, cannot present a priority received with an order, but must secure a new one for presentation to the provider of the steel. This ruling seems to have direct connection with that which prohibits the employment of middlemen in the distribution of semifinished steel and makes it necessary for the producer to ship direct to consumer. It is illustrative of the tightening in the supply of steel that what are rated as vitally essential war needs may be met. Current output of strip steel is going 100 per cent to direct or indirect war work.

Wire Fence

Finally Given War Status—Jobbers Not Faring Very Well

Pittsburgh, Oct. 15.—Woven wire fencing has been finally given a status and instead of being entirely suspended for the duration of the war to conserve the steel supply as was feared at first, it will go on with some modification. As the meager details of the new order are understood here, self-contained steel manufacturers, will not be permitted to produce, but a tonnage is to be allotted those who merely do the fabricating. What tonnages will be allowed these interests has not yet been definitely decided, but it is understood to be much less than they normally consume and the modifications also provide for fewer styles than formerly were made. Orders for nails for essential work and carrying higher priorities lately have come to makers here. This would disprove stories in circulation some weeks ago to the effect that nails were plenty. Quite the reverse has been the case; indeed, it has been said that the reason nails were not on the preference list was because there were so few available, although their omission from the list probably was based on the assumption they were in ample supply. Barb wire is a noncommercial commodity. Not only are present bookings heavy for government account, but allocations involving 150,000 tons are expected shortly. Jobbers are getting only a portion of their orders for wire products.

Freight Allowance Discontinued

Cleveland, Oct. 15.—Wire products jobbers in the Cleveland district have been advised that, dating back to Sept. 1, the Pittsburgh base will be observed in all sales by all wire makers. For years, Cleveland jobbers have bought wire upon a delivery basis of about 5 cents per 100 pounds; but now the Pittsburgh freight of 17½ cents is added. The new move tends to place Cleveland jobbers upon an equal basis with all others throughout northern and central Ohio.

Contracts Placed

Washington, Oct. 14.—The ordnance department of the war department has placed the following orders: 75,000 light Browning rifles, Marlin-Rockwell Corp., New Haven, Conn.; 101,106 water boxes, Pfau Mfg. Co., Cincinnati; 400,000 expandable belts, Boston Wire Stitcher Co., East Greenwich, R. I.; 200,000 expandable belts, American Paper Goods Co.; 15,000 aviation guns, Marlin-Rockwell Corp.

Shell Bar Demands Heavy

All Mills Operating at Maximum Capacity—Allocations Made to 60-Day Output Basis—Implement Makers Decline Cut

Chicago, Oct. 15.—So much tonnage of shell bars is required by the government for its enlarged munitions program that practically every mill able to turn out this material is operating at maximum capacity of its mills. Under these circumstances, the present plan of allocation is to provide specifications at a rate to give tonnage on mill books about equal to 60 days operation rather than to allow heavy tonnages which would require several months to fill. This gives sufficient tonnage for rolling schedules to be maintained on the highest plane of efficiency and does not clog up the books with unnecessary detail.

With production of hard steel bars rerolled from rails kept at a point limited by the supply of old rails, a rumor has been current that the government may order all old rails diverted from rerolling mills to steel plants to be used as heavy melting steel. One drawback to this action is lack of labor to cut the rails to lengths suitable for the charging box. Should such an order be made, rerolling mills would be confined to discards from steel mills, if indeed this material could be obtained.

Bar iron makers are selling steadily, all business being of a spot nature.

Won't Take Concession

Cleveland, Oct. 15.—Some of the farming implement manufacturers in this territory are reluctant to take advantage of the $5 reduction on their steel requirements for the manufacturing season of 1918-1919. This is for the reason that the reduction of material was based upon the understanding that the implement manufacturers would not increase the price of their product to the farmers during the coming year. Some of these manufacturers are uncertain whether, due to the increasing cost of labor and other contingencies, the reduced prices on steel would compensate for the higher cost production and therefore are not inclined to commit themselves. The allocation of 700 tons of bars for motors has been made in behalf of a local plant. A Cleveland jobber has been inquiring for 1200 tons of soft steel bars.

Production Cut In Two

Pittsburgh, Oct. 15.—Steel bar mills are running only about 50 per cent of capacity. As a result of more pressing demands for other lines of finished material, the allotment of ingots to the bar mills is curtailed to just about what is necessary to meet essential or high priority orders. Makers of iron bars report an active demand and their orders are practically 100 per cent from high preference sources.

Government Buying Bolts

Chicago, Oct. 15.—Heavy demand for bolts and nuts continues on the part of general consumers and by the government. The latter is placing heavy orders continually, this business being given preference over other buyers, which prevents general selling. Most makers are unable to book more than a small portion of the business offered and are forced to decline much inquiry.

Busy On Government Orders

Pittsburgh, Oct. 15.—Few orders are coming out in nuts, bolts and rivets except for use in some form of government work. This business keeps makers busy however, for it is about all that supplies of steel may be obtained for. The entire rivet output of the district is going to shipyards or to some essential government demands. Manufacturers still are hampered to some extent by a lack of sufficient help, new labor supplies falling somewhat behind those lost through the military draft.

Demand Is Moderate

Pittsburgh, Oct. 15.—Demand for hoops and bands are moderate and while production, because of the small amount of steel allotted for this purpose, is not more than 50 per cent of normal, supplies are quite ample.

Shafting Output Down

Pittsburgh, Oct. 15.—Mills rolling shafting are running about 50 per cent of capacity, steel for this purpose being limited to just about the requirements of direct or indirect government orders.

Rush Supplies to Pershing

Orders for 32,000 Rails and 1500 Locomotives Closed—New Lot of 40,315 Cars to be Given Right of Way

Philadelphia, Oct. 15.—Placing of large orders for rails, cars and locomotives for the American Expeditionary Forces continues to be speeded up to keep pace with the requirements of the advancing allied armies. The Cambria Steel Co. is to furnish 32,000 80-pound rails for the American forces and the Baldwin Locomotive Works 1500 locomotives under orders just placed. The government now is in the market for 40,315 freight cars for the American railways in France and these are to be furnished immediately. This order is made up of 9670 low-side gondolas, 7135 plain high-side gondolas, 7804 high-side gondolas with cabs, 10,010 box cars with cabs, 1050 tank cars, 4060 flat cars, 550 refrigerator cars without ice bunkers. Bids were opened Oct. 11. It is understood these cars will have precedence over the 100,000 placed some months ago.

Await New Car Awards

New York, Oct. 14.—Pending the award of 40,000 freight cars for overseas service by the government, little new business is being booked by eastern car manufacturers. There are also approximately 5000 gondolas for the Italian government on which the war industries board recently received bids but it believed that no action will be taken until the other lot has been distributed.

Of general interest to the eastern railroad equipment market is a meeting today in Washington between representatives of the railroads and the railroad administration, regarding the distribution of equipment. It is claimed by railroad interests that equipment now is being distributed to only such roads as are financially able to pay for it, and that this method should be abandoned and rolling stock allotted to all railroads in need whether they are able to pay for it at once or not.

It is reported the Baldwin Locomotive Works has received from the government an additional order for 1500 locomotives of the same type as those now being sent to France. According to a statement by Director General McAdoo, locomotive companies during September delivered 251 locomotives to the railroads. In addition, the American Locomotive Co. shipped 50 miscellaneous domestic and completed 15 foreign locomotives, while the Baldwin Locomotive Works completed one miscellaneous and 198 foreign locomotives. Thus, a total of 480 locomotives were shipped or completed during the month. This is at the rate of nearly 6000 a year.

Catching Up With Orders

Pittsburgh, Oct. 15.—Makers of small spikes are beginning to catch up with their orders as a result of the fact that for the past week or two they have given more attention to old contracts than to new commitments. A little more willingness to take on new business is observed, but prompt delivery on the smaller sizes is not yet promised and even those needed in conection with coal mining operations, which carry a high priority are not being shipped out to the full extent of orders. Fairly quick delievry can be made on standard spikes, for except for allocations for the Pershing and French government rails and moderate sized contracts from the national railroads, makers are not heavily supplied with orders. Restriction of bookings of new light rail orders has brought about an easier situation with regard to deliveries and it has permitted of some reduction of standing orders. Capacity on standard rails still is heavily engaged, though not quite to the extent it was a fortnight ago when the order to rush a tonnage 40,000 tons for General Pershing was received. In the 11 days to Oct. 11, Mills No. 1 and No. 2, of the Edgar Thompson works of the Carnegie Steel Co. which turn out heavy rails, produced 21,700 tons. This tonnage represents business booked some time ago.

A new service flag has been swung by the United States Steel Corp. from

its offices, across Broadway. The flag has "25,985" written in blue stars and "60" in stars of gold. Thirteen men from the Carnegie Steel Co., seven from the National Tube Co., five from the Oliver Mining Co. and others formerly employed by other subsidiary companies have fallen in France.

Ore Shipments

To Be Boosted By Reducing Tonnage of Frozen Ore Handled

Cleveland, Oct. 15.—Late shipments of Lake Superior iron ore are to be speeded up under a plan now being put into effect by E. D. Brigham, manager, iron ore, coal and grain traffic, railroad administration, Duluth. Small underground mines are being urged to clean up their shipments by Nov. 1, in order to permit the faster loading mines to have first call on railroad equipment during November when freezing weather will be common. Stockpiles have been cleaned up at these smaller mines and loading now is direct from underground workings. As a result, ore in cars loaded first is frozen before a trainload or cargo is accumulated. Shortage of labor and equipment for thawing ore makes the reduction of such work imperative and by relying on fast loading mines for November shipments, an increased movement is expected.

The disastrous forest fires in Wisconsin and Minnesota last week did not cripple the mining districts but did hamper railroad operations. Ore shipments will not be seriously affected.

Early indications point to a good ore movement in October. Shipments for the first week were at the rate of 9,000,000 tons for the month but this pace will hardly be maintained. Grain and coal shipments are consuming more vessel tonnage. As a result of the investigation of actual furnace requirements, a reduction of close to 2,000,000 tons will be made in the estimated needs so that the season's movement of 60,000,000 to 62,000,000 tons will prove sufficient to carry blast furnaces through to the 1919 shipping season.

Will Discuss General Priority System

Washington, Oct. 14.—Maurice Hirsch, secretary of the priorities division of the war industries board, will discuss priorities at a special meeting of the Merchants' association of New York to be held at the Hotel Astor, in the green ballroom, at 10 a. m., Wednesday of the current week. It is planned at that time to have him answer specific questions and to give detailed interpretations of the operation of the system.

Needs Tool Designers

Tool jig and gage designers, especially men who are graduates of technical schools or colleges of recognized standing, are urgently needed at the naval gun factory, at the Washington navy yard. The commandant of the yard recently issued an appeal for men who can qualify for the positions.

Big Plate Orders in Sight

Car and Locomotive Requirements for Pershing's Army to be Rushed Through Mills—Better Operating Efficiency Shown

Philadelphia, Oct. 15.—In prospective plate business the largest lot in sight consists of 30,000 tons for 1500 locomotives just placed with the Baldwin Locomotive Works, and a much larger qantity for 40,000 cars to be placed for the use of General Pershing's forces. The past week brought further numerous plate allocations but none of these were of exceptional size. One Youngstown maker continues to temporarily sell tank plates from a new mill, but the output later will go to the government. Plate output in the east continues to be curtailed by the influenza epidemic.

Plate Output Is Lighter

Pittsburgh, Oct. 15.—It having developed that ship and car builders had ample supplies of plate for the present and because there was a more urgent need of shells and rails, the plate mills have not been pushed so hard lately as they were previously. The shipbuilding program, it is reported here, is not suffering not so much for want of steel as it is from the scarcity of skilled workmen for setting the engines and doing other finishing work on the launched hulls. One of the independent steelmakers suffered the loss of four open hearth furnaces recently, due to overcharging in the attempt to speed up production.

Ship Tonnage Heavy

Chicago, Oct. 15.—Steady allocation of ship material, principally plates, continues to be made, but most of the business recently placed has been in smaller lots than prevailed earlier in the shipbuilding program. The situation is now well in hand and material is being placed with mills with much better appreciation of their ability to produce plates and in a way to obtain maximum production by eliminating duplications and changes. Plate mills are working at top speed and to the limit of their capacity and with operating conditions during the autumn the best of the year, production from now until vigorous winter weather appears will be the heaviest of the year.

Less Output

Ordered In Nonwar Pipe to Save Steel —More Cast Orders

Pittsburgh, Oct. 15.—Saving in steel through curtailment in pipe production seemingly is to be made by cutting the output of those lines in nowise helpful to the war program. Oil country goods still are being turned out freely and there has been no cut in the steel allotment for this purpose. Lapweld pipe production is being kept in check and in buttweld, a tendency to scrutinize orders carefully is observed, jobbers' replacement being held right down to the pound. The big premium that wrought iron pipe commands over steel pipe is not standing in the way of business in the latter; not only is there a sizable business from sources engaged directly or indirectly on government work, but one allocation of a good sized tonnage recently was made to replace steel pipe.

Cantonment Pipe Placed

New York, Oct. 14.—Buying for the proposed permanent cantonment at Camp Mills, Long Island, N. Y., has been among the principal transactions in the eastern cast iron pipe market during the past week. This business so far has comprised several hundred tons. Trading generally continues chiefly for government account, and is of sufficient volume to keep foundries operating at as full speed as the present scarcity of labor allows or about 50 per cent of capacity.

Nitrate Plants Buy

Chicago, Oct. 15.—Cast iron pipe for government air nitrate plants at Toledo and Ancor, O., has been placed, the United States Cast Iron Pipe & Foundry Co. taking 520 tons of 12 and 24-inch pipe for the former and 850 tons for the latter.

Export Conservation List Further Extended

Washington, Oct. 15.—All iron and steel chain, either welded, cast or stamped, has been added to the export conservation list by the war trade board effective Oct. 14. Individual licenses are not required for Canada and Newfoundland for iron or steel chain, except for all sizes of stud link chain and coil chain ½ inch and heavier. Anchor chain, open link chain and stud link chain are removed from the conservation list, also effective Oct. 14, these items being covered by modifications which appear in the list of additions. Reloading and cleaning tools for cartridges and shells also have been removed from the export conservation list.

Effective Oct. 15, the following commodities are added to the conservation list: Bars, including flats, 6 inches wide and narrower; iron and steel track bolts; fabricated structurals, including angles, channels, beams, Tees and Zees and plates ⅜-inch thick and heavier, punched or shaped, including tanks made of plates ⅜-inch thick and heavier; frogs and switches; hoops and bands, including hot-rolled and cold-rolled strip steel; mechanical tubes; iron and steel wire nails; drive pipe; line pipe; wrought iron pipe and steel plates, all classes, ⅜-inch thick and heavier and wider than 6 inches and circles over 6 inches in diameter, including No. 11 United States gage, but not No. 11 B. W. gage; poles; rails and splice bars; shapes, including angles, channels, beams, Tees and Zees; sheets, less than ⅜-inch thick; skelp; boat spikes, iron and steel railroad and steel wire spikes; steel railroad tie plates; tool steel; wire and wire rods.

Fabricators Feeling Pinch

Some Contraction of Shop Work Results—Big Tonnnage Will be Required for New Tank Orders

Pittsburgh, Oct. 15.—Fabricators of steel, who are engaged 100 per cent on government work, have felt the diversion of steel from the plate mills to those plants finishing shell steel and rails, and report some contraction in shop work as a result of less generous supplies of plates. The only important structural letting reported lately, has been one involving 2500 tons, which went to the McClintic-Marshall Co. This contract was for the lockgate at New Orleans for the navigation canal, which connects the Mississippi river and Lake Pontchartrain. This is essential work and carries a class A priority. No other class of business is being accepted for bookings for the Emergency Fleet corporation and necessary government buildings are so heavy as to tax shop capacity.

Shape Business Shrinking

New York, Oct. 14.—Business in plain shapes continues to decline in volume. Practically the only business which is now being entered on mill books is coming from the railroads, carbuilders and shipyards. Very little tonnage is being placed by fabricators. Comparatively small tonnages are being placed by jobbers. While the mills are able to accept orders without respect to priority numbers, they are restricting their shipments to A priority orders. Among shape orders placed during the past couple of weeks are a number which have been allocated.

More Tank Orders Near

Cleveland, Oct. 15.—From 40,000 to 50,000 tons of high grade material will be required for large additional orders for tanks for the American expeditionary forces, about to be distributed by the war department. Plants in this district are expected to receive portions of this order, which is a matter of some thousands. Tanks of both the larger and smaller types are to be ordered. An allocation of 2000 tons of plates, shapes and bars for a northern Ohio boiler manufacturer has been placed with a Pittsburgh mill. The same producer will fill the allocation of 1100 tons of plates and shapes for the Toledo Shipbuilding Co.

Railroads Only Buyers

Chicago, Oct. 15.—Under the severe restrictions now on all building projects comparatively little tonnage of fabricating material is being closed in the west. The only contract let last week is 675 tons which will be fabricated by the Milwaukee Bridge Co. for bridges for the Great Northern railroad. After three attempts to obtain bids on steel work for the Michigan boulevard improvement over the Chicago river, the attempt apparently has been given up until war conditions are passed. Mills in this district recently have received some tonnage of structural shapes for shipbuilding purposes which had been allocated to mills on the Pacific coast, but were too heavy for the equipment in those plants. The tonnage is not large, but is sufficient when added to previous orders to cut some figure.

CONTRACTS AWARDED

Bridge for the city of New York, 700 tons, to Phoenix Bridge Co.

American Cellulose & Chemical Co., plant at Cumberland, Md., 700 tons; to Guerber Engineering Co.

Miscellaneous work Pennsylvania railroad, 300 tons, to independent shops.

Great Northern railroad, deck and through girder spans, 675 tons, to Milwaukee Bridge Co.

Lock gates for New Orleans navigation canal, 2500 tons, to McClintic-Marshall Co.

Seven buildings for the Republic Carbon Co., Niagara Falls, N. Y., 700 tons and some tonnage of reinforcing bars to Lackawanna Bridge Co. and Worden-Allen Co.; four buildings to be erected immediately and three later.

Two buildings for National Analine & Chemical Co., Buffalo, 800 tons, general contract to George A. Fuller Construction Co.; bids on additional 400 tons to be taken.

Extension to Strong Steel Foundry, 100 tons, to the Lackawanna Bridge Co.

Structural work for Atlas Crucible Steel Co., Dunkirk, N. Y., 100 tons, to the Lackawanna Bridge Co.

CONTRACTS PENDING

State armory at Troy, N. Y., 300 tons, bids being taken.

Government storehouses, Washington, D. C., 300 tons, bids being taken.

Government boiler plant at Hampton Roads, Va., 200 tons; bids being taken.

Alterations at Boston navy yard, 1800 tons; bids being re-advertised.

Inspection shed for public service commission, New York City, 350 tons; bids being taken.

Bridge work for New York Central, 200 tons; bids being taken.

Constructing three-story plant office building for National Malleable Castings Co., Cleveland, 375 tons.

Machine and smith shops for Pennsylvania railroad 150 tons; bids being taken.

Heavy Sales

Of Spiegeleisen Cause Stiffer Market —Ferro Continues Easy

New York, Oct. 14.—Following sales of 20,000 to 25,000 tons of spiegeleisen for forward delivery which were made over the past three or four weeks, the market now is strong. Tonnage buying, however, has tapered off. While there are many transactions, most of them involve small tonnages of metal for spot and nearby delivery. The price obtained is $75 at the furnace for 16 per cent metal. In ferromanganese there is very little activity at present. The tone is easy but there has been no general shading of the prevailing $250 delivered quotation. As far as known there have been only one or two instances of concessions and these were reflected in transactions which were done on a straight unitage basis of $3.50, or $245 delivered, for 70 per cent metal. In some cases the $3.50 unit price has been shaded on units above or below 70 per cent. Such shading, of course, is immaterial.

Very few sellers have any 50 per cent ferrosilicon to offer for spot shipment, with the result that the market is firm for such delivery. Spot cars have been going at around $157.50 to $160 delivered, and some transactions have been done at even higher than these figures. The market on lots of 100 tons or more for any delivery may be quoted at $150 to $155 delivered, and it is believed that it is unnecessary to pay more than $150 for first quarter or first half contracts.

The market for ferrotungsten is steady at the recently prevailing higher level of prices. A sale of 40 tons of the alloy, analyzing 75 to 80 per cent, for shipment over the next 160 days, was closed recently at $2.75, furnace, per pound contained. Another sale of 20 tons of ferrotungsten analyzing 81 per cent for prompt shipment was closed at $2.60, furnace, but for special reasons this sale was not considered representative of the market. Further small lots of 72 per cent alloy have been sold at around $2.65, furnace. The market for prompt shipment 72 per cent ferrotungsten may be quoted $2.60 to $2.70 per pound contained, f.o.b. furnace.

Brazilian Ore Easy

New York, Oct. 14.—Prices on Brazilian manganese ore have been materially easier during the past couple of weeks as a result of the increased tonnage involved in offers. This situation arose from the fact that a good many sailing vessels which were employed in transporting coal to Brazil have become available for bringing manganese ore to the United States on their return trips. Manganese ore for early delivery in these sailing vessels originally was offered at prices ranging from $1.30 to $1.40 per unit, c.i.f. tidewater. Owing to the fact that consumers generally in this country are well covered by contracts, however, these offers did not prove attractive, with the result that sales have been made at considerably lower prices. The present market may be quoted at $1.20 per unit, c.i.f. tidewater, and at this figure at least 12,000 tons, for nearby delivery, have changed hands. Some business apparently has been done even at a shade less than this figure. Good-sized offerings continue to be made.

New Business Small

Pittsburgh, Oct. 15.—The ferroalloys market continues quiet, though in a quiet way, it is understood that quite a fair turnover in the lower grades of bessemer ferosilicon has been made and there have been a few allocations of this alloy. No details are made public, other than that the business was at the government figures. The market is rather unsettled on 50 per cent ferrosilicon, for buyers have the idea that first half of 1919 supplies are to be obtained at concessions and have been inclined to hold off. Makers generally, however, are holding firm at $150, furnace, for first half and some even higher. Few inquiries have come out for ferromanganese lately and orders in 16 to 18 per cent spiegeleisen continue to be confined to small lots, with the price $75, furnace, either for spot or contract shipment.

Active Demand

For Refractories Continues—Makers Seek Higher Classification

Pittsburgh, Oct. 15.—Active demand continues to come for fire brick for use in the iron and steel industry and makers are extremely busy in meeting these requirements, for as a result of the scarcity of labor, a production of much better than 75 per cent of normal is impossible. Among the largest current orders are those placed by the government for fire brick for nitrate plants.

Easing in the chrome ore market finds some reflection in the prices of chrome brick which now are quoted as low as $130 per net ton, as compared with a recent minimum quotation of $135. Other kinds hold at unchanged prices, but the market is largely nominal on magnesite brick, as supplies are too limited to permit of sales large enough upon which to base prices.

Refractories

(Per 1000 f. o. b. works)

FIRE CLAY BRICK (First Quality)	
Pennsylvania	$45.00 to 55.00
Missouri-Illinois	55.00 to 65.00
Ohio	45.00 to 50.00
Kentucky	45.00 to 55.00
New England	55.00 to 65.00
FIRE CLAY BRICK (Second Quality)	
Pennsylvania	$40.00 to 50.00
Ohio	35.00
New England	48.00 to 58.00
SILICA BRICK	
Pennsylvania	$50.00 to 60.00
Chicago	55.00 to 65.50
Birmingham	45.00 to 55.00
MAGNESITE BRICK (Per Net Ton)	
4 x 4½ x 2½	$105.00 to 115.00
CHROME BRICK (Per Net Ton)	
9 x 4½ x 2½	$130.00 to 140.00
BAUXITE BRICK (Per Net Ton)	
55 per cent	$ 40.00 base
76 per cent	100.00 base

The war service committee of the refractories industry held a conference Sept. 27 with Judge Edwin B. Parker, chairman of the priorities division of the war industries board, in an endeavor to secure for the industry a higher classification than was given it in Preference List, No. 2, of the war industries board. As already noted in THE IRON TRADE REVIEW, the industry was given a class IV rating in this list.

Judge Parker ruled that no general classification other than class IV would be given the industry as a whole and intimated that no individual plant classification would be given a higher rating unless an extreme situation developed wherein it was found some vital industrial plant was in danger of being closed down through inability to secure fire brick or other refractories.

It is understood that a supplement to Circular No. 20 of the priorities division will be issued shortly, defining refractories and substituting the word "refractories" for "fire brick" in the preference list. This definition in all probability will include as refractories fire clay brick and shapes, silica brick and shapes, magnesite brick and shapes, bauxite brick and probably ground fire clay (raw and calcined), ground ganister (raw and calcined) and grain magnesite.

It is expected that all manufacturers will be compelled to sign a sworn statement to the effect that at least 75 per cent of their output comes within the definition of the supplement referred to and that at no distant time they will be obliged to make a pledge which will restrict their shipments to essential industries.

Foundry Equipment Makers Form War Body

Organization of an association of foundry equipment manufacturers was brought to a definite basis at a meeting in Milwaukee, Oct. 9 at which representatives of many of the prominent producers of appliances of this character were in attendance. This action followed a masterly address on present war problems and the imperative need of organization both in the period of the war and in the coming days of peace presented by W. H. Manss, director of the war service executive committee of the Chamber of Commerce of the United States. V. E. Minich, of the Sand Mixing Machine Co. of New York, and A. O. Backert, who officiated as president and secretary, respectively, at the meeting, were continued as temporary officers of the proposed association pending a general meeting of all the manufacturers interested. A war service committee was selected to effect a direct contact between the foundry industry and the government. This is made up of Mr. Minich, Elmer A. Rich, Brown Specialty Machinery Co., Chicago; Ralph Bourne, Whiting Foundry Equipment Co., Harvey, Ill.; S. T. Johnston, S. Obermayer Co., Chicago; Lloyd Atkinson, Air Reduction Sales Co., New York; F. S. Smith, Cleveland Osborn Mfg. Co., Cleveland, and L. L. Munn, Arcade Mfg. Co., Freeport, Ill. At a subsequent meeting of the committee, Messrs. Minich, Backert and Smith, were named as a subcommittee to device effective methods for ascertaining the present war standing of the foundry equipment industry and of promoting and increasing the service it may render to the government.

Form Engineer Section

A Cleveland section has been established by the American Society of Mechanical Engineers, the section being known as the mechanical section of the Cleveland Engineer society. The section comprises Akron, Barberton, Bedford, Chardon, Cleveland, Cuyahoga Falls, East Cleveland, Elyria, Hudson, Kent, Lakewood, Lorain, Massillon, Quarryville, Ravenna, Sandusky, South Euclid, Wickliffe, Willoughby and Wooster, totaling a society membership of approximately 250. Many members of the Cleveland Engineering society are members of the American society and cooperation is thus assured.

More War Orders

Expected in Canada as Result of Allies' Drives

Toronto, Ont., Oct. 14.—Official advices received at Ottawa indicate that there will be largely increased expenditures for munitions through the imperial munitions board, embracing all classes of munition production. The monthly outlay now averages $30,000,000, which promises to be considerably increased during the coming year, owing to the great expenditure of munitions in the advance of allied forces. The airplane industry is an important factor in swelling the total, more than 3000 machines having so far been made at a cost of about $5000 each.

The new steel plate mill being erected by the Dominion Steel Corp. at Sydney, N. S., was inspected Oct. 2 by C. C. Ballantyne, Canadian minister of marine, who expressed gratification at progress. A contract for 250,000 tons of ship plates has been placed by the department of marine.

Manufacturers in that portion of Ontario dependent on Niagara Falls power have been handicapped by restrictions on their supply of power owing to demands of munition plants. The power committee of the Canadian Manufacturers association, including Maj. L. L. Anthes, J. E. Walsh and Hugh Macdonald, with George Wright and P. W. Ellis, of the Toronto hydro-electric commission, had a conference Oct. 4 with Sir Adam Beck, chairman of the provincial hydro-electric power commission, demanding information as to whether their needs during the coming months would be supplied. Sir Adam pointed out the difficulties in the way, owing to heavy war orders, which absorb the bulk of Niagara power. The sum of $2,000,000 is being spent on extensions which will be completed next month, but Sir Adam could give no assurance that they would receive any of the power. He referred the deputation to Sir Henry Drayton, Canadian power controller, as the only authority who could afford them any relief. If he saw fit to give the power to munition plants the regular hydro customers would have to go without it.

U. S. to Improve Labor's Living Conditions

Washington, Oct. 15.—Conditions outside the plants under which workers in many of the war industries are living are declared by Secretary of Labor Wilson to have reached the point where production is jeopardized. After an investigation, the war labor policies board has recommended the creation of a commission on living conditions of war workers, to eliminate certain conditions which have caused large turnovers of labor, with a consequent retarding of production. The commission will consist of a chairman and four other members to be appointed by the secretary of labor, and it will co-operate with federal bureaus, boards and departments. It will have on its staff specialists in recreation, education, public utilities, public safety, health and sanitation.

Make Revisions in Bar Iron Prices

Common Merchant Iron Remains at 3.50c Base But Refined Bars Are Fixed at 5.00c Base—Extras for Size and Quantity Are Cut to Half Their Former Levels—Classification Defined

VARIOUS changes in the bar iron schedule have been announced by the committee on steel and steel products of the American Iron and Steel institute effective as of Oct. 17. A complete new schedule has been officially put in force. The changes brought about provide for both an elaboration and a revision of the schedule previously in effect. Common bar iron remains at $3.50 per 100 pounds, but a separate classification for refined iron, with a price of $5 per 100 pounds, has been added. The distinguishing points between common merchant iron bars and refined iron bars are stipulated as well as the classification of quality to apply various forms and sizes.

A horizontal reduction of 50 per cent in all extras for size is established. These extras are now just one-half what they were in the previous schedule. Quantity differentials also are cut in two.

Chairman Gary, of the Committee on Steel and Steel Products of the American Iron and Steel institute, in making the announcement said:

The committee has received a report from the subcommittee on steel distribution based on information received from representative manufacturers of iron bars making certain recommendations which seem necessary to insure uniformity in respect of prices of various grades of iron bars and the application of extras thereto, and from such report and other data available, the committee has concluded that the following changes and modifications in respect of its recommendations dated Nov. 13, 1917, and May 21, 1918, on iron bars are fair and reasonable and recommends that new maximum prices and extras as shown hereafter, be adopted immediately.

Cancel pages 62, 63 and 64 of the institute pamphlet of August, 1918 (Iron Trade Review booklet pages 33 and 34), and substitute therefor the following:

Iron Bars

Base prices recommended by the committee on steel and steel products of the American Iron and Steel institute, Oct. 17, 1918:

Price for Base Sizes for 100 Pounds

Common Merchant Iron	$3.50
Refined Iron	5.00

Subject to the extras for size, quantity, etc., shown below. Established custom as regards delivery point to govern.

Rounds and Squares, ½ in. and smaller—and all rounds and squares over 17/8 in. are graded as Refined Iron.

Light bands, as per national list, are graded as Refined Iron.

Sizes above base sizes—in flats—are graded as Refined Iron.

Flats from 1-in. to 4-in. wide, by ¼ in. to 1 in. thick, inclusive, are graded as Common Merchant Iron; smaller flats are graded as Refined Iron.

Hexagons, ovals, half ovals, half rounds and fender, round edge and round edge tire irons, are graded as Refined Iron.

Common Merchant Iron is the term applied to material made from all scrap.

Refined Iron is the term applied to material made from puddle bar and selected wrought scrap.

ABOVE PRICES DO NOT APPLY TO SPECIFICATIONS OR TEST IRONS, WHICH ARE SUBJECT TO NEGOTIATION.

ROUNDS AND SQUARES

	Per 100 lbs.
1 to 1-7/8	Base
2 to 2-7/8	$0.10 extra
3 to 3-1/2	.25 extra
3-5/8 to 4	.40 extra
4-1/8 to 4-1/2	.50 extra
4-5/8 to 5	.65 extra
5-1/8 to 6	.90 extra
6-1/8 to 6-1/2	1.10 extra
6-5/8 to 7-1/4	1.25 extra
3/4 to 7/8	.05 extra
5/8 to 1/16	.10 extra
1/2 to 7/16	.15 extra
1/16 to 1/32	.20 extra
3/8 to 1/16	.25 extra
7/16 to 1/32	.35 extra
1/4 to 5/32	.45 extra
5/32	.70 extra
1/16	1.25 extra

FLATS

	Per 100 lbs.
1-1/2 to 4 x 3/8 to 1	Base
4-1/4 to 6 x 3/8 to 1	$0.05 extra
4-1/4 to 6 x 1-1/16 to 1-1/2	.20 extra
6-1/4 to 8 x 3/8 to 1	.30 extra
6-1/4 to 8 x 1-1/16 to 1-1/2	.30 extra
8-1/4 to 10 x 3/8 to 1	.40 extra
1-3/8 to 4 x 1-1/8 to 1-1/2	.15 extra
2 to 4 x 1-5/8 to 2	.25 extra
4-1/4 to 6 x 1-5/8 to 2	.30 extra
6-1/4 to 8 x 1-5/8 to 2	.40 extra
8-1/4 to 10 x 1-1/16 to 1-1/2	.45 extra
8-1/4 to 10 x 1-5/8 to 2	.50 extra
2 to 4 x 2-1/8 to 3	.30 extra
4-1/2 to 6 x 2-1/8 to 3	.40 extra
6-1/4 to 8 x 2-1/8 to 3	.50 extra
1-1/8 to 1-3/8 x 3/8 to 1	.05 extra
1 to 1-1/16 x 3/8 to 7/8	.10 extra
3/4 to 1/2 x 3/8 to 3/4	.20 extra
5/8 to 1/4 x 3/8 to 5/8	.25 extra
1/2 to 7/16 x 3/8 to 1/2	.45 extra

HEAVY BAND IRON

	Per 100 lbs.
8-1/4 to 10 x 1/4 to 5/16	$0.35 extra
7 to 8 x 1/4 to 5/16	.35 extra
6-1/4 to 6-3/4 x 1/4 to 5/16	.25 extra
4-1/4 to 6 x 1/4 to 5/16	.15 extra
1-1/2 to 4 x 1/4 to 5/16	.10 extra
1 to 1-3/8 x 1/4 to 5/16	.15 extra
3/4 to 1/2 x 1/4 to 5/16	.25 extra
5/8 to 1/4 x 1/4 to 5/16	.40 extra
1/2 to 1/16 x 1/4 to 5/16	.50 extra
3/8 to 7/16 x 1/4 to 5/16	.75 extra

Heavy bands, 7/16 in. thick, 5c per 100 lbs. higher than ¼ to 5/16 thick. Bevel edge shaft iron, 5c higher than same size of heavy bands.

LIGHT BANDS

	Per 100 lbs.
7 to 8 x No. 9 to 7/16	$0.45 extra
7 to 8 x Nos. 10, 11, 12	.50 extra
6-1/4 to 6-3/4 x Nos. 9 to 7/16	.35 extra
6-1/4 to 6-3/4 x Nos. 10, 11, 12	.40 extra
4-1/4 to 6 x No. 9 to 7/16	.25 extra
4-1/4 to 6 x Nos. 10, 11, 12	.30 extra
1-1/4 to 4 x No. 9 to 7/16	.20 extra
1-1/4 to 4 x Nos. 10, 11, 12	$0.25 extra
1 to 1-7/16 x No. 9 to 7/16	.25 extra
1 to 1-7/16 x Nos. 10, 11, 12	.30 extra
1/2 to 7/8 x No. 9 to 7/16	.30 extra
1/2 to 7/8 x Nos. 10, 11, 12	.35 extra
1/2 to 3/4 x No. 9 to 7/16	.40 extra
1/2 to 3/4 x Nos. 10, 11, 12	.45 extra
7/16 to 5/8 x No. 9 to 7/16	.50 extra
7/16 to 5/8 x Nos. 10, 11, 12	.55 extra
7/16 to 1/2 x No. 9 to 7/16	.65 extra
7/16 to 1/2 x Nos. 10, 11, 12	.70 extra
3/8 x No. 9 to 7/16	.75 extra
3/8 x Nos. 10, 11, 12	.80 extra

BEVELED EDGE BOX IRON

Same as light bands of same sizes.

OVAL IRON

	Per 100 lbs.
7/8 to 1-1/2	$0.20 extra
3/4 to 1/2	.25 extra
5/8 to 1/4	.30 extra
1/2 to 7/16	.40 extra
3/8 to 7/16	.55 extra
1/4 to 7/16 x 7/16	.50 extra
5/8 to 1/16 x 1/8	.60 extra

HALF OVAL AND HALF ROUND

	Per 100 lbs.
2-1/4 to 3	$0.30 extra
7/8 to 2	.25 extra
3/4 to 1/2	.35 extra
5/8 to 1/4	.45 extra
1/2 to 7/16	.60 extra
3/8 to 7/16	1.25 extra
7/16	1.75 extra
1/4	2.25 extra

Half oval, less than ¼ their width in thickness extra price.

HORSESHOE IRON

	Per 100 lbs.
All sizes	$1.00 extra

Cutting to specified length, 2 ft. and over, 10c extra.

QUANTITY DIFFERENTIALS

All specifications for less than 2000 pounds of a size will be subject to the following extras, the total weight of a size ordered to determine the extra, regardless of length and regardless of exact quantity actually shipped.

	Per 100 lbs.
Quantities less than 2000 pounds, but not less than 1000 pounds	$0.15 extra
Quantities less than 1000 pounds	.35 extra

EXTRA FOR CUTTING TO SPECIFIED LENGTHS

	Per 100 lbs.
Hot sawing or shearing 24 inch and longer	$0.10 extra
Hot sawing or shearing 12 to 24 inches	.20 extra
Hot shearing, under 12 inches	.30 extra
Machine cutting, specified lengths, above 24 inches	.20 extra
Machine cutting, specified length, 12 to 24 inches	.40 extra

Machine cutting, to specified lengths, less than 12 inch, according to contract, but not less than 60c on each size. No charge for shear cutting to multiple lengths of 12 inches and under

MACHINE STRAIGHTENING AND CENTERING

	Per 100 lbs.
Machine straightening and centering	$0.40 extra
Machine straightening alone, for ordinary sizes	.20 extra

Represents Texas Jobbers

The Texas Hardware Jobbers association whose membership is composed of all important houses doing an iron and steel jobbing business in that state, has opened an office at 320 Broadway, New York, in charge of R. F. Bell, secretary-treasurer. Jobbers in Texas, by reason of the fact that they are remotely situated with respect to iron and steel producing centers, have had great difficulty under present conditions in obtaining supplies to serve essential industries in Texas. These industries include the production of all kinds of agricultural products, cattle, sheep, and hogs, cotton, lumber, oil, horses, etc. Problems which arise in connection with the activities of the Texas jobbers will be submitted to Mr. Bell, who by reason of his new location is able to communicate quickly and effectively with the American Iron and Steel institute and with representatives of the various government departments. Mr. Bell, up to the outbreak of the war, had had an office for six years in New York as secretary-treasurer of the Wholesale Hardware and Traffic Bureau of Texas, predecessor of the Texas Hardware Jobbers association. Among the problems at present troubling the jobbers in Texas is that of obtaining an adequate supply of sheets, bars and plates.

700 War Plants

Working On $1,000,000,000 Contracts in Detroit

Detroit, Oct. 14.—With 700 Detroit concerns engaged in practically 100 per cent war work the city has now passed the $1,000,000,000 mark in government contracts. These figures have been made known by bank executives to stimulate the sale of Liberty bonds in Wayne county.

Mexican government officials have completed negotiations with Henry Ford for the erection of a $1,000,000 tractor plant in Mexico. Charles Sorensen, general manager of the Ford tractor plant in Dearborn, Mich., has gone to Mexico to select a site. All profits from the operation of the plant will be turned back into its extension and development. The project was evolved by Mr. Ford "as a means of cementing the friendship of Mexico and the United States."

Studebaker Corp. plants in Detroit and South Bend, Ind., have taken rank among the largest shell producers in the country. The corporation's government contracts aggregate more than $50,000,000, of which $20,000,000 is for shells.

The Grayhaven Shipbuilding Co., organized to construct concrete vessels, has procured a 65-acre site on the Detroit river and is working on a government contract for canal barges. It is hoped to turn out one barge every 20 days. The first two are now under construction. They are to be 150 feet long, 21 feet beam and 12 feet deep, having a 500-ton carrying capacity with displacement of 125 tons. Edward Gray and Thomas E. Currie are the heads of the new industry.

The Burroughs Adding Machine Co. has converted a large portion of its equipment to the manufacture of 2800 automatic pistols a day for the government. The company is erecting a four-story addition and is making heavy purchases of equipment.

The Hudson Motor Car Co. will build a $60,000 addition to be used exclusively for ordnance work.

Included in the new construction projects advanced this week is a boiler house for the Denby Motor Truck Co.; an addition to the Anderson Forge & Machine Co. die shop; a one-story addition to Dodge Brothers ordnance plant; an addition to the factory of the Chicago Pneumatic Tool Co.; a two-story addition to the plant of the Holley Carburetor Co.; a boiler house for the Ecorse Foundry Co.; addition to the factory of the General Aluminum & Brass Mfg. Co.; a two-story addition to the plant of the Michigan Pattern & Machine Co.; a three-story addition to the Detroit Copper & Brass Rolling Mills, and a one-story addition to the building of the Detroit Auto Piston Co.

The total production of Liberty motors up to Oct. 10 was 10,151. Of this number the Packard Motor Car Co., produced 3965; Lincoln Motor Co., 2842; Ford Motor Co., 2010; General Motors Co., 1144, and Nordyke & Marmon Co., 208.

The General Motors Co. is planning an extension of its tractor plant in Pontiac, Mich. This plant and the Samson Iron Works, at Stockton, Cal., which the company purchased last year, are each turning out five tractors a day.

The Timken-Detroit Axle Co. has let contracts for the erection of a power house.

The Spencer-Smith Machine Co., Howell, Mich., is planning large additions to its plants to make aircraft motor pistons for the government.

The F. D. Chase Construction Co. is building a gray iron foundry plant in Saginaw for the General Motors Co.

The General Motors Co. has taken over the Janesville Machine Co.'s plant, Janesville, Wis., for the manufacture of tractors.

The Mueller Metals Co., Port Huron, Mich., now employing 1100 men, has started making shell shipments. A tube mill is being built.

Steel Bookings Droop to Low Point of Year

In the month of September occurred the greatest shrinkage in unfilled tonnage of the United States Steel Corp. since the month following Sept. 30, 1917. On Aug. 31, the unfilled tonnage was 8,759,042, while on Sept. 30, it had dropped to 8,297,905, a drop of 461,137 tons or 5.26 per cent. September's unfilled tonnage is the smallest this year, May being nearest with 8,337,623. On Sept. 30, 1917, the unfilled tonnage was 9,833,477 while on Oct. 31 it had dropped to 9,009,675, a drop of 823,802 tons. A monthly comparison since April 30, 1916, follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Sept. 30, 1918...	8,297,905	461,137—	5.26—
Aug. 31, 1918...	8,759,042	124,759—	1.40—
July 31, 1918...	8,883,801	35,065—	.39—
June 30, 1918...	8,918,866	581,243+	6.90+
May 31, 1918...	8,337,623	404,259—	4.60—
Apr. 30, 1918...	8,741,882	314,522—	3.47—
Mar. 31, 1918...	9,009,675	232,049—	2.49—
Feb. 28, 1918...	9,288,453	189,400—	1.99—
Jan. 31, 1918...	9,477,853	96,135+	1.02+
Dec. 31, 1917...	9,381,718	484,612+	5.44+
Nov. 30, 1917...	8,897,106	112,569—	1.24—
Oct. 31, 1917...	9,009,675	823,802—	8.37—
Sep. 30, 1917...	9,833,477	573,572—	5.51—
Aug. 31, 1917...	10,407,049	433,115—	4.16—
July 31, 1917...	10,844,164	539,123—	4.74—
June 30, 1917...	11,383,287	503,304—	4.24—
May 31, 1917...	11,886,591	296,492—	2.43—
Apr. 30, 1917...	12,183,083	471,439+	4.02+
Mar. 31, 1917...	11,711,644	134,947+	1.16+
Feb. 28, 1917...	11,576,697	102,643+	0.90+
Jan. 31, 1917...	11,474,054	73,232—	0.64—
Dec. 31, 1916...	11,547,286	488,744+	4.43+
Nov. 30, 1916...	11,058,542	1,043,282+	10.41+
Oct. 31, 1916...	10,015,260	492,676+	5.18+
Sep. 30, 1916...	9,522,584	137,133—	1.42—
Aug. 31, 1916...	9,660,357	66,765+	.69+
July 31, 1916...	9,593,592	46,866—	0.48—
June 30, 1916...	9,640,458	297,340—	3.09—
May 31, 1916...	9,937,798	108,247+	1.11+
Apr. 30, 1916...	9,829,551	498,550+	5.34+

All Meetings Postponed

Washington, Oct. 14.—The widespread epidemic of influenza prompted Chairman B. M. Baruch of the war industries board to issue an order that all meetings with industries planned to be held after Wednesday, Oct. 16, are to be cancelled. This does not apply to regular office and interdepartmental meetings, but these are to be held down to as few as possible. It has been suggested by Chairman Baruch that each section chief of the board telegraph those industries whose representatives expected to come to Washington that all meetings have been deferred until further notice.

High Level

Is Reached By September Ingot Production—August Loss Recovered

The decline in steel ingot production noted in August was fully recovered in September and the tonnage produced last month made the second best record of the year. Figures compiled by the American Iron and Steel institute, covering 29 companies which in 1917 produced 85.10 per cent of the total output, show that 3,200,438 tons of steel ingots were produced by these companies in September, or 116,758 tons above the August total of 3,083,680 tons, and 86,975 tons below the May output, which holds the record for the year.

The September daily average production of 106,681 tons is the best record since October, 1917, with a daily average production of 108,127 tons. Compared with August, when 99,473 tons were made daily, September shows a gain of 7208 tons.

Production figures of the institute since June, 1917, are as follows:

Months	Open hearth Gross tons	Bessemer Gross tons	All other Gross tons	Total Gross tons
1917				
June.....	2,265,772	809,552	8,605	3,083,929
July.....	2,152,479	777,171	9,465	2,939,115
August.....	2,251,013	863,873	8,331	3,123,217
Sept.....	2,195,556	770,064	6,639	2,972,259
Oct.....	2,475,754	870,494	5,687	3,351,935
Nov.....	2,384,218	772,489	9,550	3,166,257
Dec.....	2,195,832	524,084	13,806	2,733,722
1918				
Jan.....	1,763,356	429,588	10,901	2,203,845
Feb.....	1,805,233	454,457	14,051	2,273,741
March.....	1,331,048	763,255	16,078	3,110,381
April.....	2,377,974	769,249	16,187	3,163,410
May.....	2,475,131	796,244	15,858	3,287,233
June.....	2,281,718	786,380	15,348	3,083,446
July.....	2,311,545	784,997	17,093	3,113,635
Aug.....	2,299,060	766,860	17,643	3,083,563
Sept.	2,410,773	772,863	16,802	3,200,438

New Coal Car Rating

The railroad administration has provided new rules for the rating of bituminous and lignite mines to provide a more equitable distribution of cars. The rules are expected to be an important factor in averting a repetition of last winter's traffic congestion and fuel famine. The daily capacity of each mine served by one carrier will be termined by taking the total coal tonnages shipped by the mine during the preceding month, dividing it by the number of hours worked and multiplying the quotient by the number of hours in the recognized work day. The result will be the daily rating of such mine and will be the basis on which cars will be distributed. Ratings for mines served by more than one carrier are determined in other ways.

Ample Supply Assured

Pittsburgh, Oct. 15.—Ample supplies of cotton ties for the remainder of the distributing season, are promised because requirements proved less than early estimates and makers will keep up production for at least two weeks more. The October price for ties is $1.96 per bundle of 45 pounds.

High Rate

Shown By Valley Furnace and Steel Works Operations

Youngstown, O., Oct. 16.—Operating conditions in the valley for the week ending Oct. 12 show little change over the previous week. While some of the coke plants operating between 95 and 98 per cent of capacity as a whole they are giving a rating of 100 per cent because the output exceeds the rated capacity by several hundred tons. Only one blast furnace is idle for relining. The remaining furnaces in the district show activity of 93 per cent. Bessemer plants are operating at 84 per cent and open hearths at 93 per cent. Approximately 1370 tons of finished steel is held up on account of embargoes. This material is billed for shipment to the points along the Atlantic coast and will be dispatched whenever east-bound embargoes are lifted.

Loss in Low Phosphorus Ore Imports Shown

Washington, Oct. 15.—The importation of low phosphorus iron ore from Spain in the period to Oct. 1 fell short 56,400 tons, according to the war trade board which has extended to Jan. 1, the time in which license may be issued to bring in this tonnage. Original plans contemplated 125,000 tons licensed before Oct. 1. This phase of the situation was discussed, along with 1919 requirements, as well as present limiting factors, at a meeting of low phosphorus pig iron producers with J. C. McLauchlan, chief of the pig iron section, and Frank Purnell, assistant to the steel director, at the war industries board last week.

Attending the conference were Leonard Williams, assistant to Mr. McLauchlan; Dr. C. K. Leith, of the shipping board's staff; Robert C. Lea, secretary and treasurer, the Robesonia Iron Co., Ltd.; C. A. Buck, vice president, and Fred Weymouth, the Bethlehem Steel Co.; F. P. Howe, the Cranberry Furnace Co.; E. L. Herndon, treasurer, and H. F. Hallman, the Eastern Steel Co.; Leonard Peckitt, chairman of the low phosphorus advisory committee; H. D. Black and R. L. Batterger, the Midvale Steel & Ordnance Co.; W. S. Pilling, president, the Northern Iron Co.; C. M. Smith, president, the Colonial Iron Co.; John M. Thomas, president, the Thomas Furnace Co.; Charles Hart, president, the Delaware River Steel Co.; Elton Hoyt, the American Iron and Steel institute; and George W. Nichols, secretary, the Stewart Iron Co., Ltd.

Want Higher Rating

Pittsburgh, Oct. 16 (by wire).—Pipe supply for coal mine operations carries an A-6 rating. The great bulk of the pipe supply is distributed through jobbers and the best rating that can be obtained in the regular classification for jobbers is B-4. The latter believe that shipments for coal mines should have the preference granted direct shipments and a committee is now in Washington presenting this side of the situation to the war industries board.

Steel Loan Subscriptions Reach Large Total

Steel corporations continue to make a great showing in their subscriptions to the Fourth Liberty loan, both on their own part and by their employes. The Steel corporation has subscribed an additional $10,000,000, making its total subscription $50,000,000. This is the largest amount ever taken by any corporation of any of the various loan issues.

The employes of the Lackawanna Steel Co., at its plant at Lackawanna, N. Y., established a splendid record, subscribing $2,137,850 which is considerably more than twice the amount taken of the Third loan. The average per subscriber was $234. By departments, the averages per subscriber were as follows: Blast furnaces, $214; No. 1 open hearth, $361; No. 2 open hearth, $338; No. 1 rail mill, $252; Nos. 2, 3 and 11 mills, $231; Nos. 6 and 9 mills, $362; electrical department, $400; coke oven department, $234. In the rail mill department, the employes have so far this year subscribed for the Third Liberty loan, Red Cross, War Savings Stamps and Fourth Liberty loan, the sum of $400,000, or a little over $600 per man.

Influenza Cuts Output

Philadelphia, Oct. 15.—Industrial activities in the eastern territory continue to be crippled by the epidemic of influenza. Many plants are running only from 40 to 50 per cent. The death list continues appalling. Fred H. Megaw, in charge of emergency purchases for the Emergency Fleet corporation in the Philadelphia district, and purchasing agent of the Harlan & Hollingsworth Corp., Wilmington, Del., died of pneumonia, aged 42. H. J. Klaer, vice president, Penn Seaboard Steel Corp., died today of pneumonia.

H. F. Black, assistant to the president of the Cambria Steel Co. with headquarters at Pittsburgh, is seriously ill with pneumonia.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

	*Copper	†Spot Straits, tin	‡Lead, New York basis	Spelter St. Louis basis	§Aluminum	Spot antimony
Oct. 9	26.00	.....	8.05	8.65	33.00	14.00
Oct. 10	26.00	.....	8.05	8.50	33.00	14.00
Oct. 11	26.00	.....	8.05	8.50	33.00	13.25
Oct. 14	26.00	.....	8.05	8.50	33.00	13.75
Oct. 15	26.00	.....	8.05	8.50	33.00	13.70

*Government fixed maximum price for prime lake, electrolytic and casting copper, in ingots, pigs, slabs, etc., less than carloads, 27.30c.

†No spot Straits tin offering.

‡Price agreed to by leading interest and independents.

§Government fixed price for 98 to 99 per cent ingot aluminum in 50-ton lots; lots 15 to 50 tons, 33.10c; one to 15 tons, 33.20c.

NEW YORK, Oct. 15.—Prospects of early peace were the main topic of interest and discussion in the metal markets during the past week. Reflection of the German peace note and President Wilson's inquiry were evident primarily in the markets for spelter and anitmony, these being the only ones among the major nonferrous metals which are not under control. Owing to the possibility of a suspension of further government contracts calling for spelter, and various other factors entering into the after-war spelter market, there was little inclination as last week closed, to buy for forward delivery. Last Friday, however, the army and navy departments telegraphed producers for bids on a total of 9000 tons of grade C spelter, which brought a quick change in sentiment. On part of this tonnage, deliveries were asked over the remainder of this year and on the balance, deliveries over the next six months. Producers who last Friday offered large tonnages of prime western spelter at 8c, East St. Louis basis, on Monday recalled these bids. October and all of last quarter prices held steady, following a previous persistent decline, October at around 8.50c and November-December at around 8.12½c to 8.25c, East St. Louis basis.

Similarly, in antimony, which is primarily a war metal, prices dropped from 14c to 13.25c at the close of last week. But on Friday, the government wired importers and dealers asking bids on 3000 tons of 99 per cent antimony metal, bids to be in Oct. 15. This large tonnage, sufficient for bullets for 10,000,000 3-inch shrapnel shells, was for delivery at the rate of 500 tons a month over the next six months. The inquiry immediately caused a change in sentiment, prices quickly returning to about 13.87½c on Monday.

Copper producers are scheduled to meet with the war industries board Oct. 23 to discuss the price effective Nov. 1. It is estimated that production of refined copper will be reduced this month by 10,000,000 pounds, owing to the explosions at the shell loading plant of T. A. Gillespie & Co., near Perth Amboy.

Less tension is evident in the lead situation, owing to the successful efforts of the lead producers' committee to eliminate some of the nonessential uses. Production of the metal is being maintained, despite the labor shortage. Prices are unchanged at 8.05c, New York basis, and 7.75c, East St. Louis basis for wholesale lots, with a margin of ½c to dealers for less than carload lots and ¾c to dealers for less than ton lots.

No further light has been cast on the tin situation. The United States Steel Products Co. is the only American importer to be granted licenses. It is reported a Holland house will buy Banca tin for the interallied pig tin pool, in Batavia, and an Asiatic importer will buy Chinese. E. Bousted & Co., an English house, as previously reported, will buy Straits tin in the East Indies. Spot Banca tin is offered at 80c to 81c.

Improving Foundry Sand Mixtures

Effect of Varying Proportions and Length of Time in Mixing Ingredients Studied and Analyzed—Reclaiming Sand With Selected Plastic Clay—Advantages of Muller Type of Mixer

BY HENRY B. HANLEY

IN these times it is, of course, exceedingly important to reduce the cost of foundry sand mixtures, not only by decreasing the amount of new sand used but also by increasing the quantity of old sand that can be used over again.

Sand preparation has only recently received the attention that it deserves, probably because other problems occupied the attention of the foundrymen and were considered more important from the standpoint of the quality of the castings and the cost of production. Different methods of molding mixtures of metal for various weights of castings and for castings for different purposes have occupied the attention of the foundrymen to the exclusion of the sand mixing department now considered important.

There is no doubt that ultimately ways and means will be found to use up all of the old sand; also, that the old cores will be broken up and used over again. Furthermore, unless the foundry is so small that it cannot afford the expense it is absolutely necessary to employ a metallurgist or chemist to experiment with the different kinds of new sand, to investigate the possible reduction of binder for core sand with the use of cheaper binder than was formerly used and generally to supervise the more thorough and more economical preparation of molding sands.

It is believed by many engineers who have studied the subject that the most satisfactory means of mixing is by the use of a muller type of machine, provided that the mulling action does not destroy the original structure of the sand but simply incorporates the various ingredients into a uniform mixture, at the same time maintaining its original porosity.

Locating the Mixing Department

It is important properly to locate the sand mixing department so that the new sand can be delivered as automatically as possible into the mixing machine, and to take away the resultant mixture quickly and economically, thus securing the maximum capacity from the mixer. Also, where one machine is used for both facing and core sand it should be located so that the core mixture and the facing mixture can be transported to whereever they are to be used in the foundry with as little delay and expense as possible. Likewise, the return of the old sand to the machine should be kept in mind so that the expense of so doing will not counteract the advantage of using up the old sand. It is important that the sand be distributed so that the molders will not have to wait at any time for a fresh supply of sand.

Hand mixing is absolutely a thing of the past not only on account of the labor conditions at the present time but also because of the reduction in cost, as obviously it is impossible to reduce the quantity of sand required, by hand mixing, as can be done mechanically.

Accurate records should be kept of various mixtures required for certain classes of work and the cost of such mixtures should be proportioned per ton of castings. In other words, the cheapest mixture that can be used in any particular class of work should always be determined and then this particular mixture should be absolutely maintained.

The time of mixing should be carefully investigated, as in core sand especially it is just as bad to mix the sand too long as not long enough, it being more expensive to continue the mix beyond the time required. I have heard a great many foundrymen make the statement that poor sand preparation is responsible for more lost castings than any other cause.

It is also possible with the muller type of mixer to secure a good distribution of sea coal particles for facing and to decrease the amount of sea coal that is required. Consider the immense saving in time effected by the molder in finishing the mold that is made with well mixed sand. The mold will not fall to pieces so easily and therefore requires less finishing. The metal will not cut into the mold because the sand presents a tougher exterior. It is not difficult to note by observation the difference in the cores of the rough, loose edges where the sand is not properly mixed. These edges, of course, are liable to wash off and the pieces get to the top of the casting and cause endless trouble in the machine shop, resulting in the scrapping of the castings.

Where a foundry uses mostly green sand it is all the more important to prepare it properly, especially where there is a variety of castings of both heavy and medium weight. In such

From a paper presented at the annual meeting of the American Foundrymen's association, Milwaukee, Oct. 7-11. The author, Henry B. Hanley, is associated with the New London Ship & Engine Co., Groton, Conn.

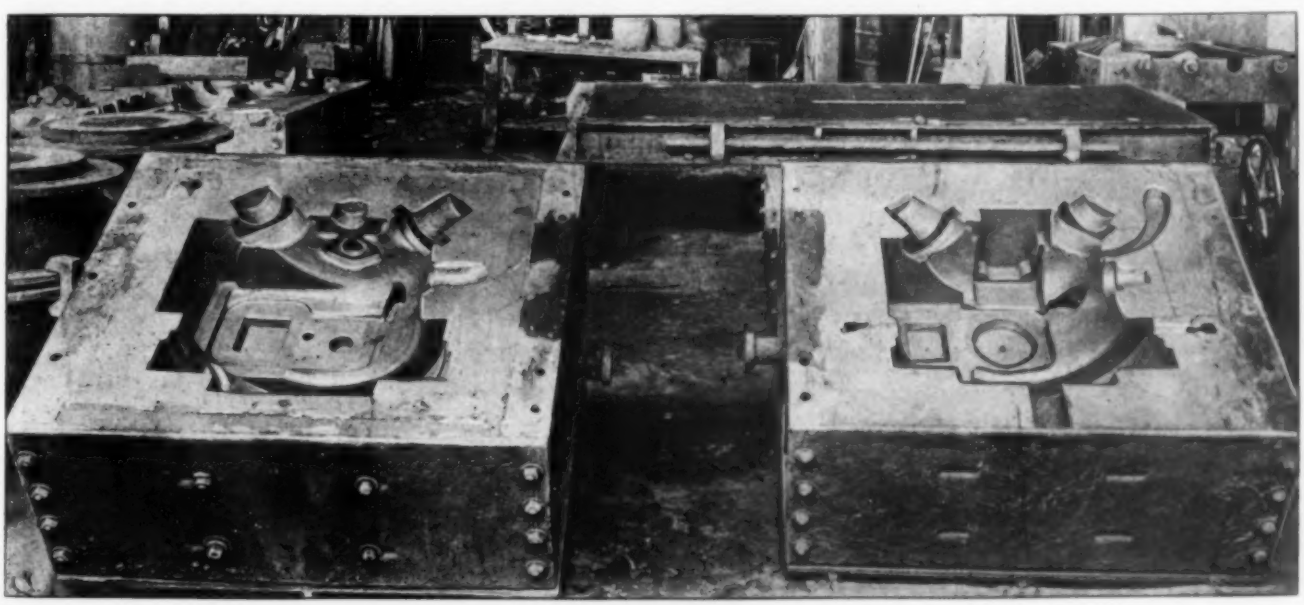


FIG. 1—CYLINDER HEAD MOLD IN WHICH RECLAIMED FACING SAND WAS USED

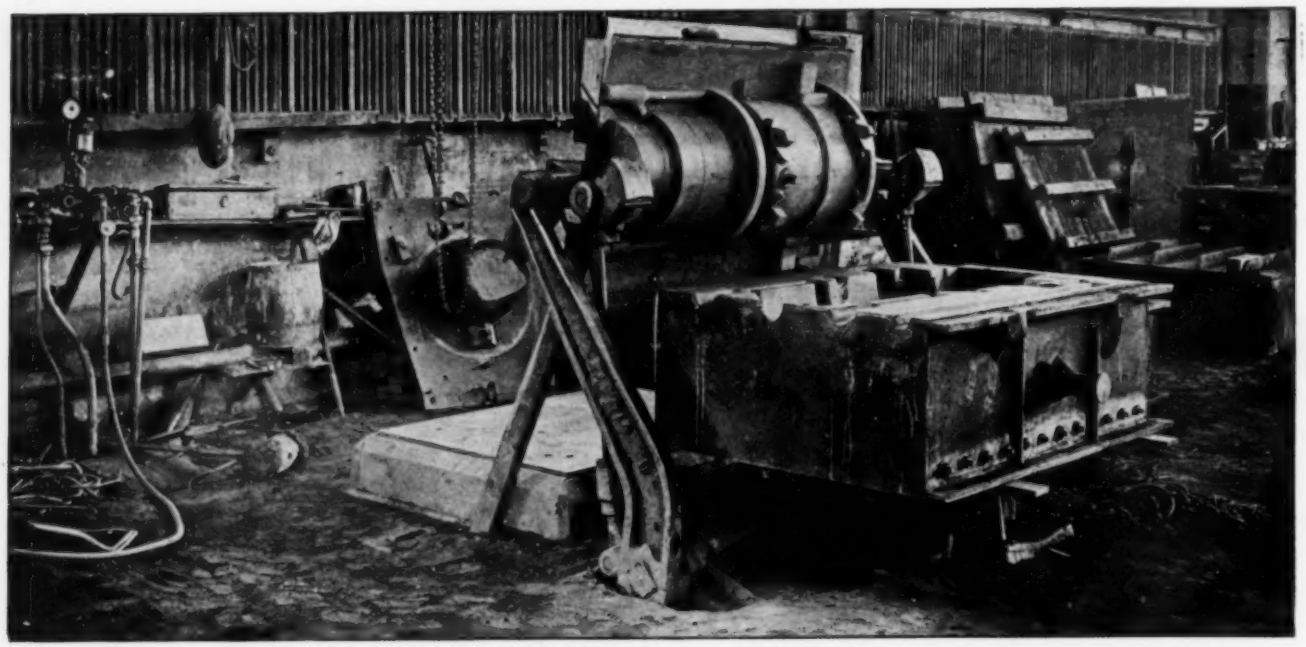


FIG. 2—METHOD OF MOLDING WITH IMPROVED AND RECLAIMED SAND

cases mixtures of sand can be produced with small addition of binder and sea coal that are quite economical. On the other hand, mixtures are required with much stronger bond and more careful manipulation. It is oftentimes desirable to arrange for various bins for the different mixtures, so that there is no chance of using a mixture that is not adapted to the particular class of work to be done.

Another valuable use of the sand-mixing machine is that tough sand can be cheaply made for large copes because less sea coal is needed and the cope part of the mold is not so apt to scab; also the cope is much less liable to drop out, as it is often the case with poor facings.

Fig. 5 shows a large cylindrical pan 7 feet in diameter, with sides 12 inches in height. The mullers are supported on steel shafts which are independent of each other. The ends of these shafts are provided with shoes which move in guides in the frame. The muller shafts are supported by heavy steel springs which may be set in such a position that the mullers are close to but not in contact with the muller plates when the pan is empty. The space between the mullers and the muller plates can be adjusted to suit the blending requirements. A mechanical unloader permits of emptying the machine while running.

In our experience with the muller type of sand machine, we found it important to make a careful adjustment of the mullers so that they do not rest on the pan. In this way there is little danger of grinding the material to a powder. On the other hand, if the muller is in contact with the pan a continuous grinding goes on which is harmful for any sand. In the first place, the grain size and grade of the mixture is altered and the whole mass is broken into fine, sharp particles. When such sand is dumped out, it does not feel right, is weak and very sharp. With proper attention to the position of the muller excellent sand can be obtained at all times in not exceeding five minutes time of mulling. This will give the maximum bond for the mixture used. Mulling for three mintes will give nearly the same bond as five minutes. The ultimate bond is dependent on the mixture used, the temper, the revolutions per minute and the time.

While conducting a number of tests on green sand facings that contained sea coal, we were surprised to find that the sea coal had a serious effect on the bond. Tests were made to determine to what extent sea coal could be used in good facing and still have the bond required for safe working. A mixture was made of old sand 60 per cent and new sand 40 per cent, no sea coal being used. The molds were blacked and the cast-

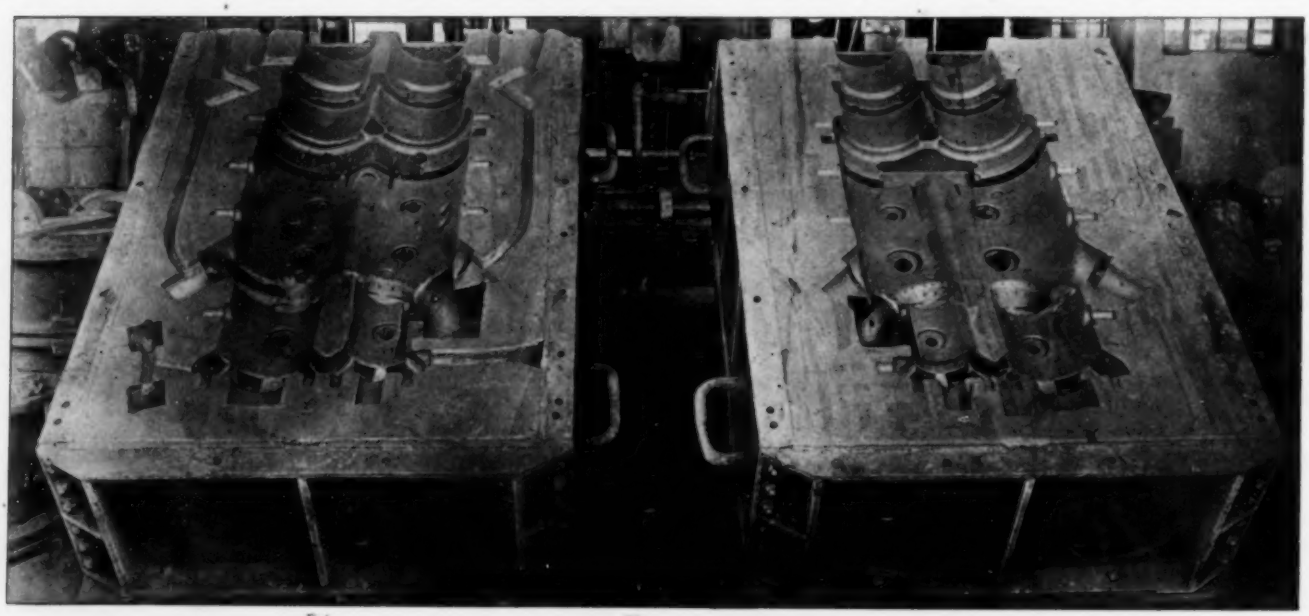


FIG. 3—AIR COMPRESSOR CYLINDER MOLD

ing came out fine. Next, 3, 6 and 9 per cent additions of sea coal were tried. On passing 6 per cent the bond was so seriously weakened that quite poor castings were produced. All of these mixtures were prepared in the muller previously described and were mixed in five minutes mulling. After a careful investigation, it was learned that the sea coal breaks up the continuity of the bond imparted by clay or impurities. This weakness attributed to sea coal could easily have been overcome by additions of more new sand, but since this means increased cost for facing it, it was decided to adopt the safe working limit of 6 per cent for facing intended for medium weight castings.

Careful Selection of Sands

In selecting molding sands we have tried to secure strong bond sands at all times. We find there is economy in the purchase of these strong bond sands because they will go further than a sand of weak bond in adding to old sand or in making a facing. One can appreciate the effect of adding 10 per cent of extra strong stove plate sand to the heap sand, when to begin with the stove plate sand selected for this work contains double the bond of other sands. There are some advantages about reclaiming old sands with strong bond new sands that should appeal to those who do not have a muller. It is not so difficult to mix thoroughly the two sands as it is when the mixture of clay is undertaken.

Strong Bond Sands Economical

To make clear the influence of selected strong bond sands for reclaiming purposes, our experience has been that they are economical and safe in plants where there are no means of controling the reclamation work, such as tests that show exactly what the bond and other qualities are.

We have found that fire clay is not suited to molding sand work for the simple reason that it takes too much clay to develop the bond when added to old sand. The reason for this is the fact that fire clay does not possess any amount of plasticity but is generally nonplastic. We have found additions of 10 per cent fire clay a serious detriment in sands intended for facing, because with the clay in the old sand plus the added clay which made a total of 20 per cent, troubles in venting and blowing developed. On cutting the fireclay addition down to 5 per cent the troubles were eliminated, but the bond was not reliable. If the molds dried out from long standing the cope would drop from weak bond. When mullers were first introduced for sand reclamation it was thought possible to take any foundry clay, add old sand, and make new molding sand. This idea is disappearing because the knowledge of clay today shows that there is a great variety to select from, each having a different bond and plasticity. Excellent results are obtained when the proper clay is chosen for the work, as the following table indicates:

	Ordinary Fireclay	Selected Plastic Clay
Bond absorption figure	2000	12,000
Transverse strength	15 lbs per sq. in.	275 lbs. per sq. in.
Clay substance plus impurities, per cent.....	96 per cent	98 per cent

In selecting the clay to be used a strong bond plastic clay should be specified. As the table shows, practically the same amount of clay is used, but its quality and its influence on the ultimate strength or bond of the sand being reclaimed will differ enormously. This has been explained previously and is due to the superior physical quality and not the chemical qualty of the selected plastc clay.

When one changes from the use of ordinary fireclay to a strong plastic clay and attempts to rejuvenate the old sand an entirely different result is obtained. With the plastic clay a good strong bond that is reliable is secured. Only a small amount, 5 per cent, or sometimes less, is required to develop an excellent feeling in the worn-out sand. This is a tempting line of investigation because it offers a considerable return on account of the great economy possible. Backing sand for heavy work needs nothing more than a small amount of plastic clay and a few minutes in the muller. When one considers the vast differences in properties of clay that are suitable for this line of work it is easily understood that the future advances will be made not by using the ordinary fireclay but the selected plastic clay.

Adding Clay to Sand Mixtures

It is still a matter of argument between foundrymen as to the best way to blend sands to get the best results. Some prefer the dry mixing method and then tempering; others prefer to mix and temper at the same time. Our experience has shown that wet mixing in a muller develops about all we expect from the ingredients. We have had the best results by adding clay in the form of emulsion, while the machine is in operation. This allows the clay to spread over the surfaces and avoids lumps in the mixture. It is entirely a matter of clay dispersion over sand surfaces that makes ultimate bond. We all know that a liquid condition for the added material is superior to the dry condition. By mixing the clay with water we can develop the maximum amount of bond with the minimum amount of clay.

Facing Sand Mixtures

When we have a muller at our disposal, we find that it is thoroughly practicable to utilize some of our local sands by adding 25 per cent to our new facing sand mixtures. In this way we are saving 50 to 75 per cent against the cost of new molding sand brought from long distances. A good mixture for medium weight castings can be prepared in a muller by taking 50 per cent old sand, 25 per cent local sand, 23 per cent of new sand and 2 per cent of selected plastic clay. It is of importance, however, to first

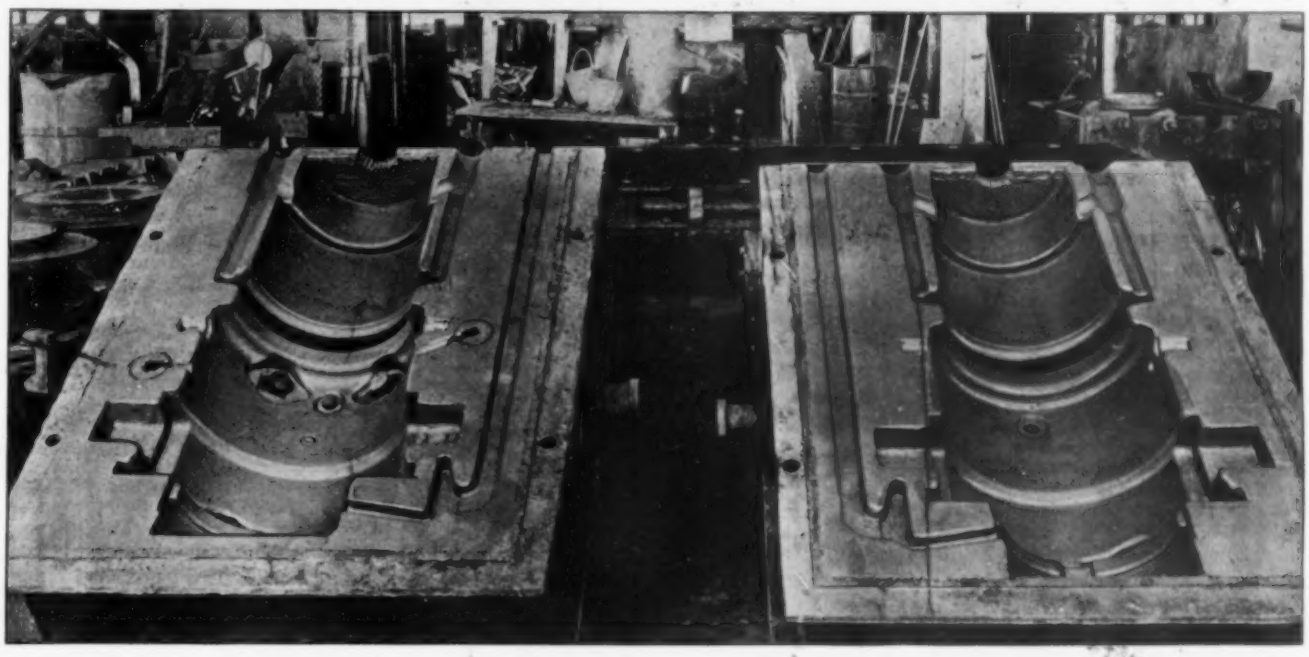


FIG. 4—WORKING CYLINDER MOLD IN WHICH RECLAIMED SAND WAS USED

know that the local sand is of refractory character. It matters not whether it contains clay or other bond; this can be put into the mixture at will.

The quality of the work produced is the main consideration in sand reclamation. The results obtained so far are decidedly in favor of mechanical treatment of the sand. When a mixture is found satisfactory for a certain line of work it can be duplicated, thereby giving each molder the same quality of sand. This avoids the personal equation where each man thinks he is better prepared on his own facing requirements than the next one. We have seen hundreds of important castings come exactly the same in surface appearance day after day. They were not made from exactly the same formula for sands but the texture and bond were what was required for the job. To have complicated castings free from sand defects it is necessary to give the sand mixing some study.

Figs. 1, 2, 3 and 4 show a variety of dry sand molds in which we have successfully employed improved and reclaimed facing sand. The molds are for diesel engine castings.

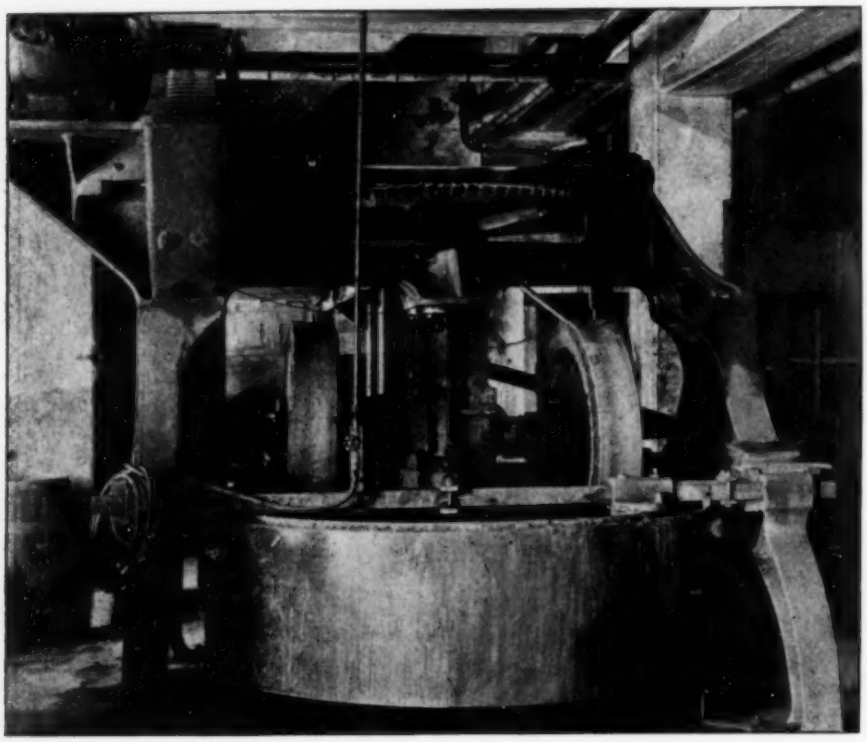


FIG. 5—SAND MIXING MACHINE OF MULLER TYPE

Toledo Plants Are Getting Coke Oven Gas

Coke-oven gas is now being distributed and measured for industrial purposes in Toledo much as it is sold and metered for domestic uses in other cities. Up to the latter part of 1915 natural gas had the field in Toledo entirely to itself but since then great difficulty has been experienced in securing an adequate supply for both the domestic and industrial demands of the city. The construction of a by-product coke-oven plant by the Toledo Furnace Co. has to a considerable extent solved the difficulty, the gas from this plant now going to several of the large industries of the city. The distributing agency is the Toledo Railway & Light Co. through its high pressure system. The gas is measured by electrical meters of the Thomas type, built by the Cutler-Hammer Mfg. Co., Milwaukee. This meter was described in THE IRON TRADE REVIEW, March 2, 1911.

The Willys-Overland Co., the Mather Spring Co. and the Libby Glass Co., are large enough users of the furnace company's gas to require Thomas meters, which make possible the measurement of the gas directly in the units in which it is bought and sold or compared. Direct measurement is accomplished by raising the temperature of the gas two degrees as it flows through the meter and measuring accurately the amount of heat required to do this. It has been scientifically established that the specific heats of the constituents of an industrial gas are approximately the same. It also is a well known fact that a definite quantity of heat is required to raise a pound of gas two degrees, whether it be compressed by an increase of pressure or expanded through an increase of temperature. The meter is not likely to register errors inasmuch as the measurement is based on the amount of energy required to heat the gas.

The Toledo Furnace Co.'s coke plant consists of 94 Koppers ovens of the standard regenerative type divided into two batteries of 47 ovens each. Each oven has a capacity of 12¼ tons of coal, operating on a 16-hour coking schedule. Two mains, equipped with Connersville positive type boosters, convey the gas away from the ovens. The gas passes through a measuring station 500 feet from the boosters, where two 20-inch 500,000 cubic feet per hour meters are located. These meters are so arranged that one carries the normal load and the other is by-passed for inspection or repair. During the peak periods they are operated in parallel and when desired they can be put in series for a check on accuracy.

From the meters, the gas flows through 16,300 feet of 20-inch welded steel pipe to the electric station of the Toledo Railway & Light Co. This station has a generating capacity of 35,000 kilowatts and 19 of the 31 boilers are equipped to use either gas or coal. This calls for the use of sufficient gas to need another meter. From this station, the 20-inch line is continued 8800 feet to the gas plant of the railway and light company. At this point the gas passes through a set of purifiers before entering the 1,500,000-cubic foot storage tank. The line leading from the storage tank to the Willys-Overland plant is made up of 24-inch, 20-inch and 16-inch pipe, with a total length of 21,400 feet. Not far from the Willys-Overland plant, a 16-inch line leads to the plant of the Mather Spring Co. The line to the Libby Glass Co. is 14,600 feet long and is made up of 12-inch, 10-inch and 8-inch pipe. At the various consuming points meters are installed to determine the consumption of gas.

New York Export Houses Amalgamated

The W. J. Crouch Co., Inc., and Rownson, Drew & Clydesdale, Inc., announce the amalgamation of their respective organizations. All trading and manufacturing operations henceforth will be conducted under the name of Rownson, Drew & Clydesdale, Inc., with general offices at 68 William street, New York City. P. G. Donald, president of Rownson, Drew & Clydesdale, Inc., will continue to hold this office, while I. Smullyan, president of the W. J. Crouch Co., Inc., will act as managing director of the new firm. Victor E. Karminski and A. E. Hearne, each treasurer and general manager of the W. J. Crouch Co. and Rownson, Drew and Clydesdale, respectively, will in the future act as joint general managers of the new concern, Mr. Karminski conducted the Crouch steel division and Mr. Hearne directing all other trading operations. Plans have been made to develop further the company's engineering division to meet the demand for gravity runways, portable elevator conveyors and other labor saving devices. The plans are under the direction of John J. Smart, secretary and assistant general manager of the W. J. Crouch Co., Inc. The company will undertake a vigorous advertising campaign, in all foreign countries and in the United States. Other former officers of W. J. Crouch Co. will continue with the new company. These include H. Lad Landau, sales manager and assistant secretary; John H. Allen, purchasing agent, who will be assisted by M. Greenburg of Rownson, Drew & Clydesdale; Albert Smullyan, comptroller.

The Foundryman's Iron Problem

Each Ton of Pig Wasted Means Less Striking Power on the Western Front—How the War Industries Board Handles the Problem of Distribution

BY C. J. STARK

Editor, The Iron Trade Review

WAR has put normal foundry business in the discard. No major section of the iron and steel industry has been so extensively dislocated by the transition of the United States from a peaceful to an aggressively belligerent nation, as the casting industry, particularly in its chief branch, gray iron. It would be difficult throughout the length and breadth of the country today to find many shops which are turning out work they were originally built or designed to do; or were doing a little more than a year ago.

The steel mills are producing shell rounds and shell billets by the millions of tons. They are yielding plates at the annual rate of 6,000,000 tons, whereas before the war their best record was approximately 3,700,000 tons yearly. They are rolling other lines of finished material at a tonnage rate far different, both less and greater, from that shown in previous years or under ordinary business conditions. This has been brought about primarily by an altered division of raw steel supply and secondarily by the building of some new mill and steel works capacity. From those mills finishing products for which the demand has been less insistent, ingot tonnage has been diverted to other units capable of producing material called for by the most vital purposes. This largely has been a process of adjustment and of accommodation to a new line-up of demand. It has been facilitated by the virtually permanent condition in the steel industry of an excess of finishing mill capacity over steel works output; likewise by the range of operations possible on certain types of mills. Thus, the rail and structural shape mills as well as the merchant bar mills have been turned to the rolling of large rounds for projectiles; and much of that steel which ordinarily would have gone into rods for wire products, into sheet bars for sheets and into small billets for merchant bars, or other finished products, has been put into slabs for plates, into large billets for shells or into some form to suit the particular requirements of war. It has been a question of speeding up the production of this or that product to the utmost point which has been made possible by a maximum and continuous supply of raw steel; and contrariwise by putting the brakes on the output of other mill material less essential from a tonnage standpoint. This on the whole, has involved no radical departure from standard practice; or from the line of manufacture for which the respective plants were established originally. War demands plates, rails, sheets, wire, structural shapes, bars, tin plate and virtually all finished steel lines, as well as peace, though in different proportions.

With the foundries, however, it has been an entirely different situation. Modern war does not require castings to the extent or in the form demanded by the pursuits of peace. Furthermore by its intense absorption of such basic materials of production as pig iron, scrap, coke, coal, etc., it imposes restraints upon everyday civil life and cuts down normal consumption. The result is a surplus of foundry capacity which if it is to be maintained and to prove itself of use in the big test of national service, must adapt itself to the new conditions and must fit itself for the things that are within its power to perform. And this it often proves is no easy task. War is a minute science and its standards are high. It demands the satisfaction of exacting chemical and physical specifications; the enforcement of rigid inspection methods and a general preciseness of practice which the majority of casting manufacturers seldom are called upon to observe in normal operations. This usually means for the average foundryman new equipment, new methods and more or less reorganization of his shop, both as to the personnel and as to the co-ordination of the processes of production. It frequently requires extensions of capacity. In some cases, entirely new plants have been erected to make a specific war essential, such as grenades, ship castings, tractor parts and other lines. All of this involves not only initial plant expense and increased overhead, but delays, losses and difficulties of production which are incident to the undertaking of any new line of output.

Transformation of Foundry Industry

It requires little imagination to grasp the sweeping changes that must have taken place to put a stove foundry, a cast-iron pipe shop, or an ordinary jobbing plant on a basis where it may successfully turn out in quantity, cast shells made to millimeter dimensions. Such a transformation indicates the radical readiustment which actually has been taking place in many parts of the foundry industry today, and as a result of which the striking power of the nation has been materially increased. It should be a source of gratification to the whole country and a mark of credit to the initiative and spirit of the industry that many casting plants have responded so promptly and well to the nation's call.

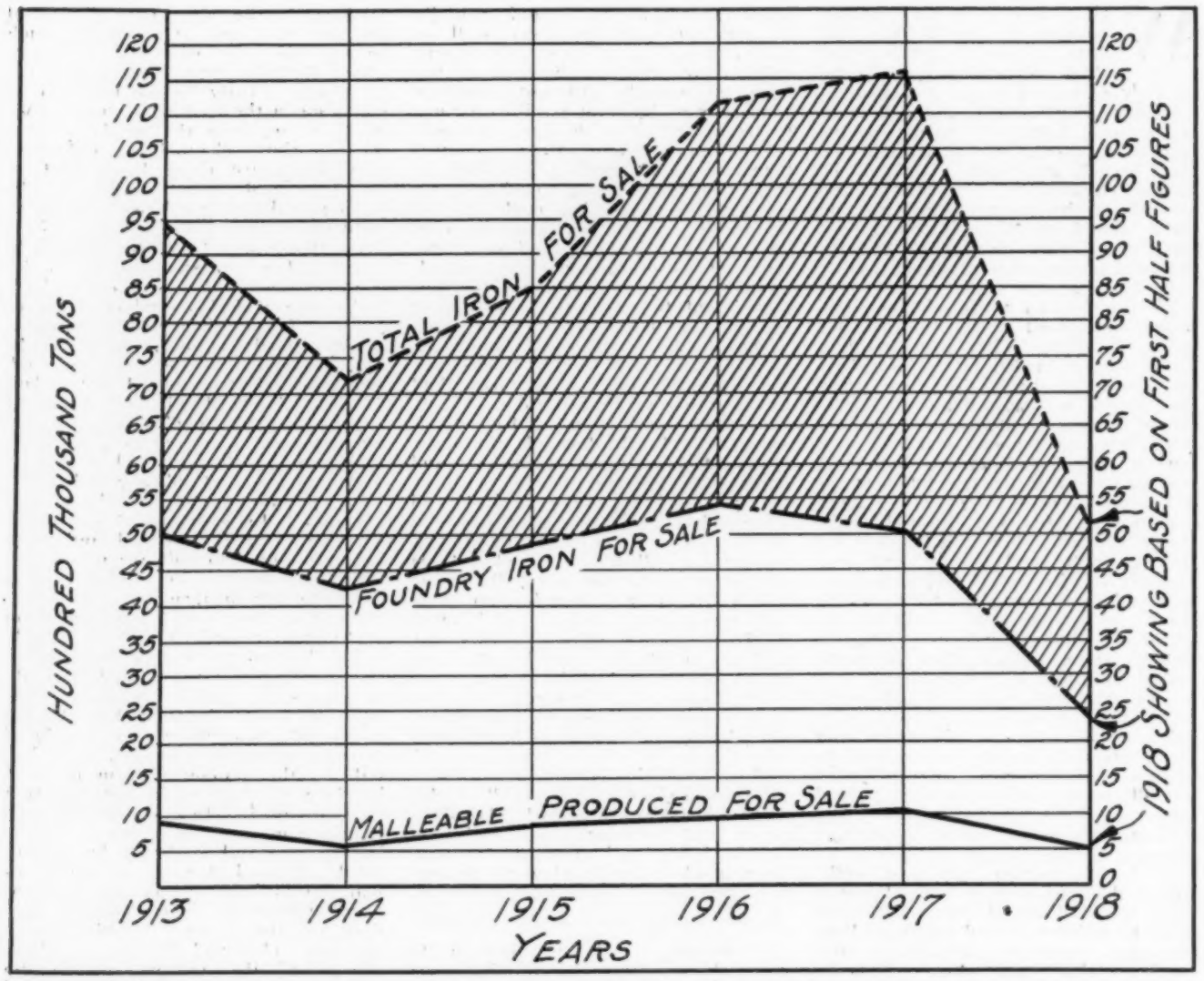
But as the situation has developed, it is becoming more and more evident that the foundryman is acting with little choice in the matter. His is and promises to become more so, a real and vital problem. It is not too much to say that the existence of many plants for the near future, at least, is at stake. Only by the foundryman engaging in the casting of some product entering into the needs of war or into those channels of consumption which are deemed essential to public interest under wartime conditions may he assure himself of those elements of industry without which he cannot operate. Every announcement and move at Washington by those in control of war industry clearly has revealed this fundamental condition. These elements of industry are described as labor, capital, facilities, material, transportation and fuel. The war industries board under date of Sept. 7 issued what is described as the "master key" governing the requirements of present industry. This is known as Preference List No. 2. It defines essential industry and classifies it according to its relative importance. In effect it distinguishes between what is essential and what is not essential in industry under prevailing conditions. It will serve as a guide to foundrymen in settling for themselves the troublesome question as to what constitutes essential work.

The key to the foundryman's position at the present time is his supply of pig iron. Only by getting his plant on war and essential work may he be able to count upon a supply of this indispensable material; and then only to the amount of iron required by the percentage of his capacity that is so engaged. In other words, such requirements as arise from specific war or essential work are being supplied. Beyond that, no assurance of material is held out by the government authorities. The course of wisdom for the average foundryman is obvious. The steel director, in whose charge is the present distribution of pig iron, has repeatedly sounded the extreme need for the strictest conservation of pig iron and the necessity of every foundryman so altering his accustomed practice as to permit of that economy. The pig iron supply of the country is short, considerably so. There is no possible way by which the tonnage lacking can be made up. This stringency and the general labor situation, point to materially reduced production by the foundries as the war goes on. The more liberal use of scrap in mixtures is not likely to offer much permanent relief since the supply of cast and other cupola metal is shrinking and replenishment of stocks by the yards and dealers is becoming more uncertain: furthermore the growing shortage of labor makes it more difficult to sort the considerable amount

of scrap which comes on the market in a mixed condition. In the steel-making grades of scrap, the shortage of supply already has become acute.

Allocation is a word of which we are hearing a great deal today, but its significance and the workings of the system that it represents are not always clearly understood. An allocation is an order and it is primarily applied to raw material rather than to manufactured articles. Thus we have allocations of pig iron and steel which are regarded as basic materials. in stock and on order is insufficient to enable him to complete this work, applies to the department which placed the order or to the director of steel supply, for such additional quantity of iron as will enable him to carry out his contract.

Should the application come to the director of steel supply, it is referred to the proper government department which has, or will secure through investigation, the data necessary to enable it to make a request for an allocation of the amount of pig iron



RELATION OF FOUNDRY IRON FOR SALE TO TOTAL OF ALL GRADES PRODUCED FOR THE MARKET SINCE 1913

It would be well not to go too far into the technical phases of the rather complex machinery of the government for regulating the flow of essential materials except to say that no priority ratings are given to different demands for pig iron because that metal is put at the root or starting point of industry and the supply is to be distributed or husbanded as the imperative demands dictate.

The primary function of the pig iron section of the division of steel supply of the war industries board is to procure pig iron for governmental orders. A manufacturer having been given a government order for certain material and feeling that the tonnage of pig iron which he has needed. To determine the proper tonnage full information is secured as to the weight of the castings required to complete the contract; the amount of iron the manufacturer has in stock, in transit or on order; the analysis preferred; the usual source of supply; and the percentage of scrap normally used by the manufacturer.

This information is carefully considered by the government department which then makes a formal request on the director of steel supply for the tonnage of pig iron considered necessary, submitting with the request confirming data. The case is then considered by the pig iron division which has in addition to the information submitted by the government department, data secured from the questionnaires returned by the producers, from personal interviews with various manufacturers, from investigation and from various other sources. All these facts are taken into account in arriving at a final decision. In certain cases it has been found that the manufacturer was not entitled to an allocation as he had sufficient iron on order and merely needed assistance in having it shipped. There have been cases where allocations were refused on the ground that the manufacturer would be able to fill his contract from his own iron if he would conserve it by using a proper proportion of scrap in his mixture. In this connection it may be stated that aside from performing valuable service in conserving pig iron and properly distributing the available supply, the pig iron division is doing considerable educational work. This is accomplished by eliminating many of the old rule-of-thumb methods of the foundries dating back to the days when iron was graded by fracture instead of analysis; and by showing the foundrymen how they can make advantageous changes in their practice. This latter course includes increasing the amount

of scrap used, combatting the idea that four or five brands of iron are necessary to make up a mixture, discouraging the extravagant use of higher silicon iron, etc. It is pointed out that these methods will help the foundrymen to hold their organizations together and protect their invested capital, should it become necessary to reduce the supply of foundry iron.

The amount of pig iron required by the manufacturer under consideration having been determined, a regular allocation request form is made out by the pig iron division and is sent to the committee on pig iron, ore and lake transportation of the American Iron and Steel institute, which has headquarters at Cleveland. The latter suggests the furnace which is to furnish the tonnage.

Trade Customs Respected

It is the intent and endeavor of the director of steel supply to upset trade customs and usages as little as possible. On receipt of the allocation request, the local committeemen of the district in which the manufacturer for whom the iron is to be secured is located, make every effort to place the order with the furnace which has usually served the particular user unless such an allocation would involve cross haulage or some similar circumstance. But should the furnace in question have so many allocations that it cannot accept further tonnage, the committeemen then endeavor to place the allocation with the furnace most conveniently situated to supply the manufacturer's needs. In such cases, due consideration is paid to the various phases of the railroad situation, the rate of freight, similarity of the iron to that ordinarily used, time required for delivery and other conditions. There have been cases, however, when it was impossible to observe the conditions outlined as when the grade of iron needed could only be supplied from another district. In such cases the question of supply has been considered paramount.

The furnace to receive the order having been determined, the director of steel supply is notified. After he authorizes the allocation, the manufacturer is advised either by the government department for the completion of whose order the iron is needed, or in certain cases where the pig iron section has requested the allocation, by the director of steel supply, that he may send his regular formal order to the designated furnace. The order calls for specified tonnage and grade of iron which is to be shipped at a prescribed rate. Accompanying this notification is an "authority" from the government department or the director of steel supply which serves to give the furnace assurance of the governmental validity of the manufacturer's order.

In cases where iron already ordered by the manufacturer is needed for the completion of government work, the director of steel supply instead of allocating, upon presentation of proof that the iron is required for governmental purposes writes the furnaces direct "ordering in" the iron. These instructions have all the weight of an allocation. Like an allocation, shipments under such instructions have preference over any other shipments even though every other order on the furnace books as developed by the questionnaires, is shown to be for 100 per cent governmental purposes.

A War of Ingots

Much has been said and written as to this being a war of steel. Rather it might be said it is a war of ingots instead of one of castings. At least it has been such for some months, though the situation now is undergoing considerable change.

Germany, to all reports, has been putting to good use her foundry capacity for the production of primary war material. This is in the making of cast shells. This country proposes to do likewise. In the tremendous semisteel shell program which the war department now is unfolding, there is an opportunity opened to miscellaneous foundries to materially increase their direct participation in war production and their standing as plants of the preferential class entitling them to pig iron and other essentials. The program as now outlined calls for a total of 33,000,000 of 3, 4.7, 6 and 8-inch shells. It is estimated that these orders ultimately may take up 25 per cent of the capacity of the casting plants of the country. At least 1,000,000 tons of metal are involved which on the basis of the usual semisteel mixture would mean 600,000 to 700,000 tons of pig iron and 300,000 tons of scrap. Malleable as well as gray iron shops now are preparing to engage in the making of semisteel shells on a big scale.

It would be difficult to estimate the actual percentage of foundry capacity that now is engaged in turning out direct or indirect war work. Six months ago, it was a comparatively meager total. Questionnaires returned by foundry consumers to the furnaces in May made a low showing on direct war work. This ran from about 10 to 25 per cent. The indirect war demands, however, were considerably larger. It is doubtful, however, whether at that time more than 50 per cent of melting capacity was taken up by orders in any way related to war. Since then the foundries have been more active in putting their facilities at the disposal of the government and in determining what portion of the war program they could fit themselves to do. The result has been a steady increase in war work among the casting plants. This is reflected by the figures of iron allocated by the committee on pig iron, iron ore and lake transportation during the past five or six months. Out of 1,052,000 tons allocated since May 1, 292,000 tons have been of foundry grade. This is the largest tonnage for any single grade excepting basic with 420,000, and is in fact in excess of the latter as far as domestic consumption is concerned. This is because the basic so placed included 180,000 tons of basic for the British government. Allocations of malleable iron since May were 109,000 tons and of low phosphorus iron, 109,000 tons. With but minor exceptions all this iron is for delivery this year.

These increased allocations of foundry iron also tell another story. They reveal the growing difficulties of the foundry users in obtaining their supplies from their usual sources. This is due to the shrinking production of foundry iron. More unfilled tonnage of foundry iron is on the books of sellers today than in any other grade. This largely was entered by the usual route of open market purchases before the government took a close grip upon distribution. When it can be delivered, if at all during the period of the war, is a question.

Production of pig iron in 1918 was begun with an estimated shortage of over 500,000 tons. This was occasioned by the severe weather conditions and the freight tieups which seriously affected the operations of the furnaces in November and December. These conditions continued through January and February and by March 1 the estimated shortage stood at over 1,500,000 tons. It was appreciated by those who analyzed the situation that the foundries, especially those in the gray iron class, were likely to suffer severely from the shortage. This was because the heaviest and most pressing war demands being for steel, it was realized that the production of steelmaking pig iron would be favored and that as far as possible, the loss of tonnage would be made up by switching more furnace capacity to these grades. This meant that a number of stacks producing foundry iron would be changed over. This is exactly what has happened.

Furnaces Change Burdens

Under a growing shortage of steelmaking iron, especially basic, this transposition from foundry, bessemer or malleable, to basic production by the merchant furnaces has been marked. Probably not less than a dozen furnaces have been changed over since this country went to war. At Cleveland six stacks, of which at least four had been making foundry or malleable for sale, now are all making basic. The production of foundry iron in the Chicago district has been cut down materially by the same cause; a similar condition has been shown in the Mahoning and Shenango valleys, in southern Ohio and in eastern Pennsylvania. In Alabama, three companies are producing portions of an order for 80,000 tons of basic allocated to them for England which is to go to the repayment of iron and steel borrowed from the British government by General Pershing for the American Expeditionary Forces. Recent years have witnessed the increasing union of merchant blast furnaces with steel works which were rounding out their sources of pig iron supply and this has brought about some contraction of the tonnage of iron made for the market, including a liberal amount of foundry iron. The apparently insatiable demands for steel from this country since it engaged in the world war, however, have been responsible for the accelerated increase of basic iron production at the expense of other grades.

In considering the prospects of the foundry industry as to future pig iron supplies, it is well to review iron

production in this country since the world war began.

The output of foundry iron in that period has not kept pace with general production. In 1914, of the total tonnage of iron made for sale by the blast furnaces of the country, 59.7 per cent was of the foundry grade. This represented an increase from 53.4 per cent of the merchantable iron made in 1913. In 1915 this proportion had dropped to 55.9 per cent, in 1916 to 48.6 per cent and in 1917, nine months of which found the country at war, to 44.4 per cent. In the first half of 1918, however, it rose to 47 per cent.

The relation of foundry iron made for sale to the total of all grades produced for the market since 1913 is as follows:

Year	Total iron for sale tons	Foundry iron* for sale tons	Per cent
1913	9,523,885	5,084,952	53.4
1914	7,362,980	4,393,089	59.7
1915	8,583,007	4,801,711	55.9
1916	11,253,317	5,473,196	48.6
1917	11,676,513	5,186,498	44.4
1918 (First 6 mos.)	5,226,245	2,458,412	47.0

*These figures also include ferrosilicon and almost all the charcoal iron made in the country.

The record of malleable iron has been more irregular. It shows both decreases and increases during the war period. Its relation to total production made for sale is as follows:

Year	Malleable produced for sale tons	Percentage of total merchant iron
1913	989,241	10.4
1914	671,771	9.3
1915	829,921	9.7
1916	921,486	8.2
1917	1,015,579	8.7
1918 (First six months)	563,279	10.8

During the first half of 1918, foundry iron produced for sale fell off 90,377 tons from the first half of 1917, and 179,279 tons from the last half of 1917. The rate of foundry iron produced for sale to the total amount of iron made for the market during the first half of 1918, however, it will be noted, increased to 47 per cent. This increase was due to the fact that the output of iron made for sale in all grades during the first six months of 1918 declined at a higher rate than in foundry iron.

Against the first half of 1917, the six months loss in merchant iron of all grades was 458,544 tons and against the second half of 1917, 765,479 tons. In looking for an explanation for this, it is found in the tonnage of bessemer iron made for sale. A loss of something like 400,000 tons in the bessemer made for the market during the first half of 1917 and of 500,000 tons during the last half of 1917 is shown by the figures for the first half of 1918. This precipitate drop in bessemer is the sequel to the abnormal increase in the demand for this grade which was the basis for the rapid expansion of the export trade in pig iron of this country in 1916 and 1917. In 1916 we exported 607,236 tons of all grades and in 1917, 653,931 tons as against 277,648 tons in 1913. Our exports now are running at about 200,000 tons annually.

The dominating feature of the production statistics for the first half of 1918 is that basic iron output, notwithstanding the reduced operating capacity at the start of the year, has held its own. The total of this grade produced in the first half of 1918 was 8,617,692 tons against 8,620,604 tons in the first half of 1917 and 9,051,058 tons in the last half of 1917. It is apparent that in overcoming the loss in basic output occasioned by the low rate of operations at the beginning of the year, bessemer and foundry capacity was utilized. The conclusion is plain that basic production has the right of way and will be maintained at the expense of other grades, as necessary.

The significance of the comparisons shown of the production statistics from 1913 to 1918 is this: The demands for foundry iron have not increased in anything like the proportion as steelmaking iron, particularly basic. While the total tonnage of iron of all grades made for the market increased by over 22.6 per cent between 1913 and 1917, the proportion contributed by foundry iron declined approximately 9 per cent. In the same period the total output of all blast furnaces, that is both steel works and merchant stacks, expanded from 30,966,152 tons to 38,620,967 tons or 24.7 per cent. The relation of the foundry iron made to the total production in the same period declined from 16.8 per cent to 13.4 per cent. It is well to point out here that all but a negligible quantity of foundry iron which has been produced in the country in recent years is for sale, or to put it another way, all the gray iron foundries of the country buy their metal in the open market.

Where Scrap Comes In

The relative decline in foundry iron production since 1914 necessarily does not mean a falling off in the output of gray iron castings in the war years. The number of gray iron shops in the United States in fact increased from 4267 in 1916 to 4325 in 1918. The missing factor is supplied by the scrap consumed. There is no way of ascertaining how much scrap went into foundry mixtures during these years. Basing an opinion on the usual practice and existing conditions, however, it is safe to say that the proportion of scrap to pig iron was materially increased. This is because a high market for pig iron always operates to swell the amount of comparatively low-price scrap the foundryman puts into his castings. In 1914 and 1915 there was a low market on both iron and scrap. In 1916 the market for No. 2 foundry at Chicago and at Birmingham registered an advance of from $9.50 to $12.50 per ton and No. 1 cast at Chicago and in eastern Pennsylvania from $2 to $4.50 per ton. In 1917 occurred the climax of the phenomenal rise in prices. No. 2 foundry at Chicago went to $5 and at Birmingham to $50. No. 1 cast rose to $31 at Chicago and to $38.50 in eastern Pennsylvania. These comparative prices without doubt tell their own story. It will be well to bear in mind in this connection that the supply of scrap today is short as well as of pig iron which means less freedom to regulate mixtures.

All statistical studies of pig iron production and of the irreducible demands both for waging the war and for the maintenance of national life, point in only one direction. They emphasize the uncertainty and the instability of the position of the foundry industry taken as a whole. They proclaim the urgent necessity for the foundry plants of this country to readjust themselves so that they shall effect every possible economy in the use of iron and to concentrate their attention only upon such work as clearly shall be of an indispensable character. If they do not, no one would care to predict the consequences. The suggestion from Washington on this point is direct and unmistakable.

Even were this not the case, the tremendous demands for steel from the government and its allies and from the essential nonwar requirements of the country would be deeply significant. At present these orders, the steel director estimates, aggregate at least 23,000,000 tons, representing a practically eight months' production and they are still growing. To fill them every steel works in the country must be driven at top speed for an indefinite period. This means the providing of constantly maximum supply of all elements of production, at the base of which is pig iron. Modern war largely is in terms of steel. It conscripts blast furnaces as readily as it does human lives.

In the words of Judge Edwin B. Parker, chairman of the priorities division of the government, steel is the most precious metal in the world today. With equal truth he could have said the same of pig iron, for without it no steel is possible. It becomes, therefore, the highest patriotic duty of every foundryman in this country to make every ton of pig iron count for its full value. Waste today is more than an economic, it is a national loss. Every foundry proprietor, manager or superintendent should keep before him daily the fact that for each ton of pig iron wasted, 3300 hand grenades are lost to the boys in the trenches.

Speed at Essington Works

Although the Essington works of the Westinghouse Electric & Mfg. Co., South Philadelphia, Pa., has not been completed a year, and will not be able to operate at full capacity for some time to come, in production the shops are already ahead of their schedule. Handicapped by its requirement for labor the company is adding as rapidly as possible to its force of female workers. The blading section in the turbine department is operated by women, who are being taught to use the file, the chisel, the punch and the hammer in their efforts in helping to win this war. Other women have been engaged for the steel-metal working department, and are turning out sheet steel boxes and lockers. So far the introduction of woman labor in these works has proved successful.

The press crew in the forge shop which produces steel forgings for turbine and reduction gear axles, for ship propeller shafting and tail shafting, increased its output from 83,000 pounds to 105,000 pounds of steel forgings in five days. In the foundry the average output per day now amounts to 300,000 pounds of castings.

Malleable Reports for Examination

Engineering Properties of Malleable Iron Recommend it For Many Construction Uses—The Characteristics Are Scientifically Presented and Its Uniformity is Established

BY H. A. SCHWARTZ

IRON in its various forms is no doubt the world's most valuable material of construction. It finds its application in the arts principally in two general forms, as steel and cast iron. Both these materials are well known to the designing engineer, and he uses them freely and with confidence as their respective properties adapt them to his needs. A third form, malleable cast iron, or malleable for short, is relatively little known to him and unfortunately appears to be respected to an equally slight degree.

We are accordingly confronted with all manner of peculiar opinions regarding this product and its application to engineering projects. It is no doubt natural that the conservative engineer finally resolves any doubts as to the properties of a material with which he is unfamiliar against that material. Such a course is only good conservative practice from his point of view, but may nevertheless be a decided detriment not only to the producer of the discarded material, but also to the prospective user.

From a paper presented at the 1918 meeting of the American Foundrymen's association. The author, H. A. Schwartz is connected with the National Malleable Castings Co., Indianapolis, Ind.

Malleable Iron Demands Recognition

RECENTLY complied statistics list 268 malleable iron foundries in the United States and Canada, an increase of over 20 per cent since 1916. The capacity of the country's malleable foundries at the present time is about 1,000,000 tons a year, valued at $160,000,000. This growth in product is only a visual indication of the general advance of the industry. The quality and uniformity of malleable iron, as a result of scientific research have made even greater strides. The objections of engineers to malleable have been based upon a lack of knowledge of the material and its physical properties. The writer of this paper outlines what has been done to place malleable iron upon the sound basis of established practice and to render it capable of quantitative analysis. The characteristics of malleable iron recommend it for many construction purposes in which it is at present unused.

There are many instances where steel for example has been substituted for malleable at an increased cost and a decreased service. The objection in the engineer's mind to malleable iron seems, in the last analysis, to be twofold and to result primarily from a lack of familiarity with the product in question. These two objections are first, the fact that he appears to be uninformed as to the physical constants and properties of the material, more particularly in a quantitative sense and, second, that he appears to lack confidence in the uniformity of the product as now manufactured and hence doubts whether the material is dependable, even though he has access to data as to its physical properties in individual samples.

A considerable number of years ago, Dr. Henry M. Howe, then of the Columbia school of mines, began preaching the doctrine that the properties of all the iron products might be explained by regarding them as a continuous series of alloys of iron and carbon and this view has since found favor among most of the metallurgists who have had occasion to work in these fields. It may be well, therefore, to approach the subject from

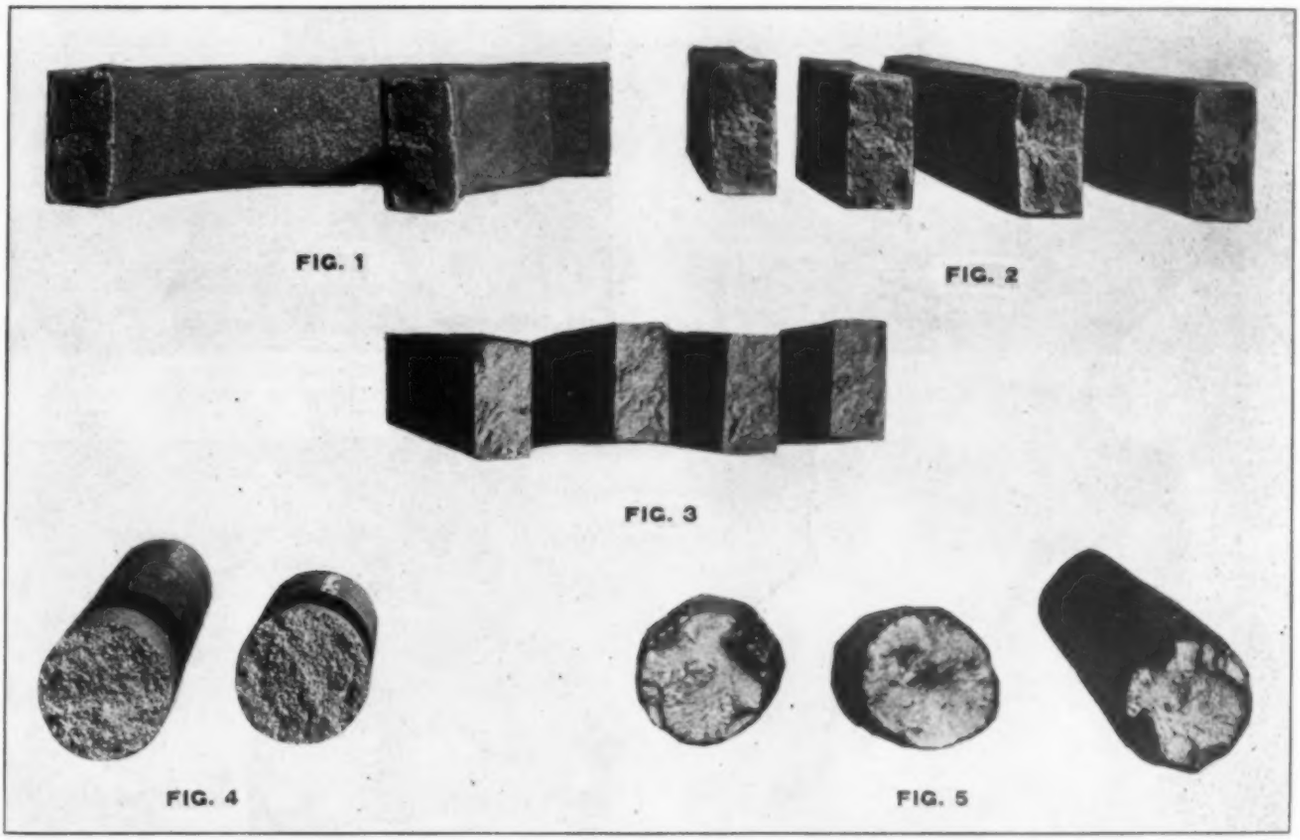


FIG. 1—FRACTURES OF MALLEABLE IRON BROKEN BY BENDING. FIG 2—FRACTURES OF MALLEABLE IRON BROKEN BY TENSION. FIG. 3—FRACTURE OF WHITE IRON, BEFORE ANNEALING. FIG. 4—FRACTURE OF GRAY IRON. FIG. 5—FRACTURE OF CAST STEEL

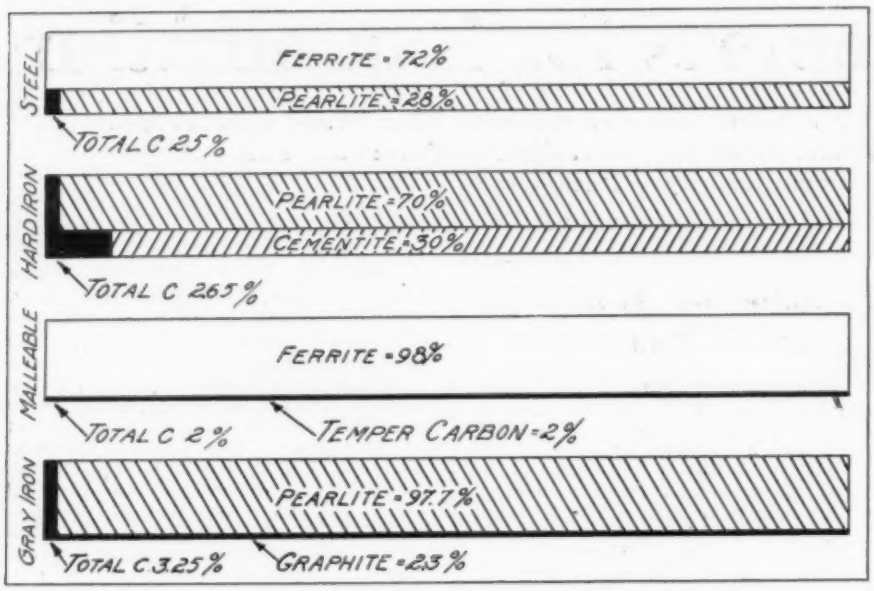


FIG. 6—AMOUNT AND DISTRIBUTION OF CARBON IN COMMON ALLOYS

this viewpoint in order to explain not only what malleable iron is, but why it is, and to make clear to the technical reader, who may not be versed in the details of its manufacture, the principles upon which the successful making of malleable iron depends. The manufacture of this product, while it is an extremely complex metallurgical process, nevertheless depends on certain broad generalities and laws, a knowledge of which will make possible the continuous production of a uniform product.

In the early stages of the iron industry articles which were to be made malleable, *i. e.*, hammerable, were made by the smith of wrought iron. These articles owe their malleability to the fact that wrought iron is practically pure iron. All other forms of iron contain quantities and forms of carbon which interfere with this malleable property. Alloys high in carbon, however, possess the advantage of great fusibility and are, therefore, capable of being cast in any desired form in molds, instead of being laboriously hammered into shape.

In 1722 Reamur conceived the idea of decarburizing a high carbon casting by heating it to bright redness in iron ore. The resulting product would be a casting of practically pure iron. Some years later, Seth Boyden, working in Newark, N. J., practiced what he supposed to be the same art which had been invented by his great French predecessor. He found, however, that the product of his operations differed generally from Reamur's product in that the material though soft and malleable was black instead of white. Unknowingly, Boyden had discovered an entirely different principle of malleablizing and continued to practice it without any understanding of the reason for his results. From Boyden's work there grew directly and indirectly the modern malleable casting industry. Boyden's work is in brief as follows:

Carbon exists in iron in two chemical forms, in the free state and as a carbide called cementite. Cementite contains 6.7 per cent carbon and is soluble in both solid and molten iron. The solubility corresponds at the melting point to an alloy containing little less than 2 per cent of carbon, decreasing with the temperature until at just about 700 degrees Cent. it corresponds to an alloy containing 0.9

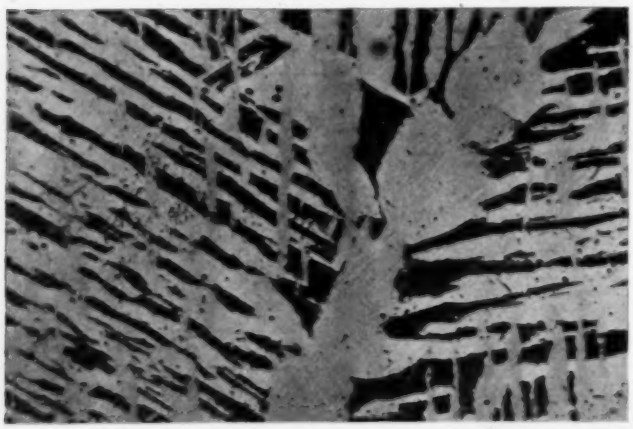


FIG. 7—MICROSTRUCTURE OF UNANNEALED STEEL

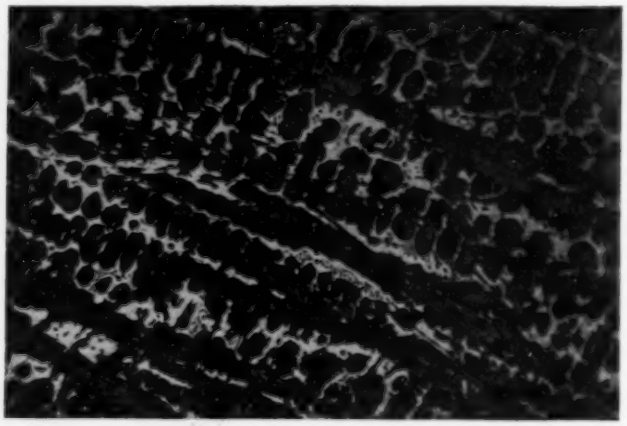


FIG. 8—MICROSTRUCTURE OF WHITE CAST IRON

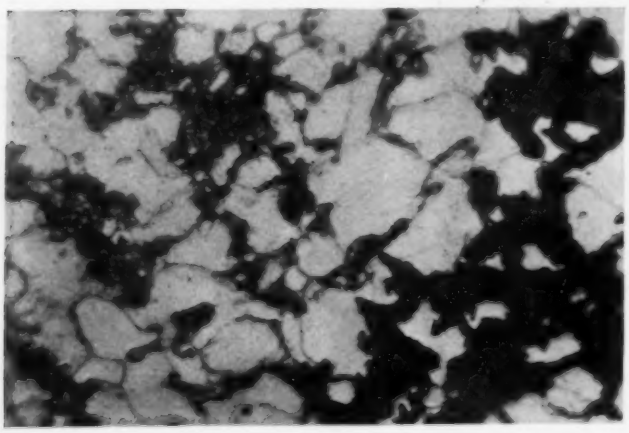


FIG. 9—MICROSTRUCTURE OF MALLEABLE CAST IRON

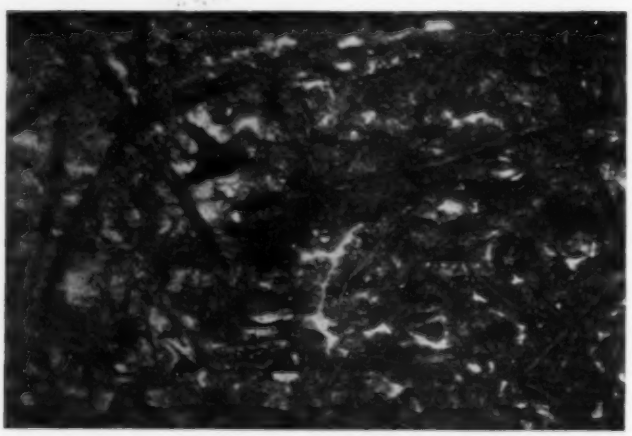


FIG. 10—MICROSTRUCTURE OF GRAY CAST IRON

FIG. 11—TEST BARS ILLUSTRATING PROPERTIES OF STEEL, MALLEABLE IRON AND GRAY IRON

per cent carbon. In cooling below the critical point the solubility abruptly becomes zero.

Solid alloys, such as the foregoing, are in the metastabile condition, *i. e.*, there are internal chemical forces striving to bring about rearrangement but unable to do so because they are counterbalanced by the restraining influence of low temperature. The alloy desires to attain the stable condition in which it will consist of iron and iron carbide. The solubility of carbon is less in the free state than in the form of cementite at all temperatures below the melting point. At 700 degrees Cent., the critical point, it is zero instead of being 0.9 per cent. It is a general law that any chemical reaction in a solution will proceed in the direction of formation of that one of the possible compounds which will remove itself from the solution; hence, given the opportunity, cementite will break up into iron and carbon, the later crystallizing out of the system.

This conversion of the system of $Fe\text{-}Fe_3C$ is called graphitization. Graphitization is promoted by increased temperature and by the presence of certain other elements notably silicon, aluminum and titanium, and is hindered by the presence of manganese carbide, iron sulphide, chromium, tin and some other elements.

Gray cast iron contains considerable amounts of carbon and silicon. Such an alloy will graphitize quite rapidly in the temperature interval extending about 30 degrees Cent. below its freezing point (1130 degrees Cent.) This carbon crystallizing out under these conditions is formed in a semi-liquid mass of iron and grows into thin plates like fish scales.

Under ordinary conditions the body of the metal contains nearly 0.9 per cent combined carbon and is in effect a fairly high carbon steel. Iron containing less carbon and silicon graphitizes but slowly and if of proper composition will show no graphite when cooled in a mold. Such iron, however, will graphitize if maintained sufficiently long at an elevated temperature. If this temperature be but little below the melting point, gray iron will be produced. If the temperature be chosen lower, say 900 or 1000 Cent., the carbon will separate but being formed in a solid medium is unable to grow into scales of graphite. It then curls into approximately spherical forms and with sufficiently prolonged cooling the result is a pure iron matrix through which free carbon in globules (temper carbon) is scattered.

Black Heart Malleable

This product is modern black heart malleable made by a process very similar to Reamur's but different in principle since no attempt is made to remove the carbon from the metal but to crystallize it out in a comparatively harmless form leaving a body of pure, and, hence, malleable iron. The similarity of this product to wrought iron is close; both are pure iron, the temper carbon of malleable corresponding approximately to the slag inclusions of wrought iron.

In the light of what has been said, it is evident that the problem before the metallurgist is the production of a metal which will freeze without any trace of graphite but which can be graphitized in the subsequent annealing operation. Both of these requirements are subject to well understood chemical laws; the former is one of chemical composition, pouring temperature, cooling conditions, and so on; the latter is one of chemical composition and heat treatment. In both cases they are subjects which can be and have been thoroughly investigated by interested parties, and are conditions which can be accurately controlled. There is, therefore, no guesswork whatever, nor any mystery connected with the manufacture of malleable cast iron, at least by producers of the higher class; such producers understand quite clearly what they are about, what ends they desire to attain and what steps are consistent with the attainment of these ends.

There are to be sure such interruptions or variations of manufacturing technique as are inseparable from any manufacturing operation in general; even the steelmaker and ironfounder also occasionally fail in the execution of their process. Such failures do not result from ignorance or from the application of unknown and unexpected laws, but are merely errors in the execution of clearly understood processes. Nor is the malleable industry more subject to these

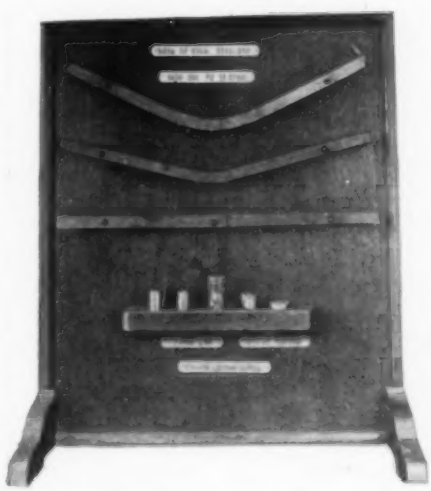


FIG. 12—BEHAVIOR OF STEEL, MALLEABLE IRON AND GRAY IRON IN CROSS BENDING AND COMPRESSION

FIG. 13—UPPER PORTION SHOWS ELECTRICAL PROPERTIES OF MALLEABLE, GRAY IRON AND STEEL—AT BOTTOM ARE SHOWN STEEL, MALLEABLE AND GRAY IRON WEDGES DEMONSTRATING RESISTANCE TO SHOCK

vagaries than either of its larger and older sisters.

All commercial iron products are essentially non-carbon alloys and differ among themselves according to the amount and form of carbon present. Steel contains but little carbon (around 0.25 per cent in the case of the cast material) which is all combined; white cast iron, that is unannealed malleable, contains approximately 2.6 per cent carbon, also all combined, and is much harder and more brittle than steel. When it is annealed to malleable, the carbon is somewhat reduced, say to about 2 per cent and all converted into the free state in the form called temper carbon; cast iron contains about 3¼ per cent carbon, a considerable part of which is combined, say 0.9 per cent, and the remainder in the free state, as graphite. The form in which carbon is present depends on the presence of other elements and upon the heat treatment as already pointed out. In moderately slowly cooled metal, the following constituents may be expected:

Ferrite—Pure iron, a soft, ductile metal of fair strength and great elongation resembling copper in its general physical properties.

Cementite—A definite chemical compound of iron and carbon containing 6.7 per cent carbon; chemically it is carbide of iron Fe_3C. It is very hard, much harder than glass and very brittle.

Pearlite—This ingredient is a mechanical mixture of ferrite and cementite of such a composition as to contain 0.9 per cent carbon. It is stronger, harder and less ductile than ferrite and is known to every one as annealed tool steel.

Temper Carbon—Pure carbon in the amorphous or uncrystallized condition.

Graphite—Free carbon in crystallized form.

All the irons of commerce are made up of one, two or three of the ingredients just mentioned; the low carbon steels containing less than 0.9 per cent carbon are mixtures of ferrite and pearlite, high carbon steels and white cast irons are mixtures of pearlite and cementite; gray iron is a mixture of graphite and pearlite, occasionally containing also either cementite or ferrite but never both; and malleable iron is a mixture of ferrite and temper carbon.

The accompanying diagram, Fig. 6, will indicate the amount and distribution of the carbon in the four types

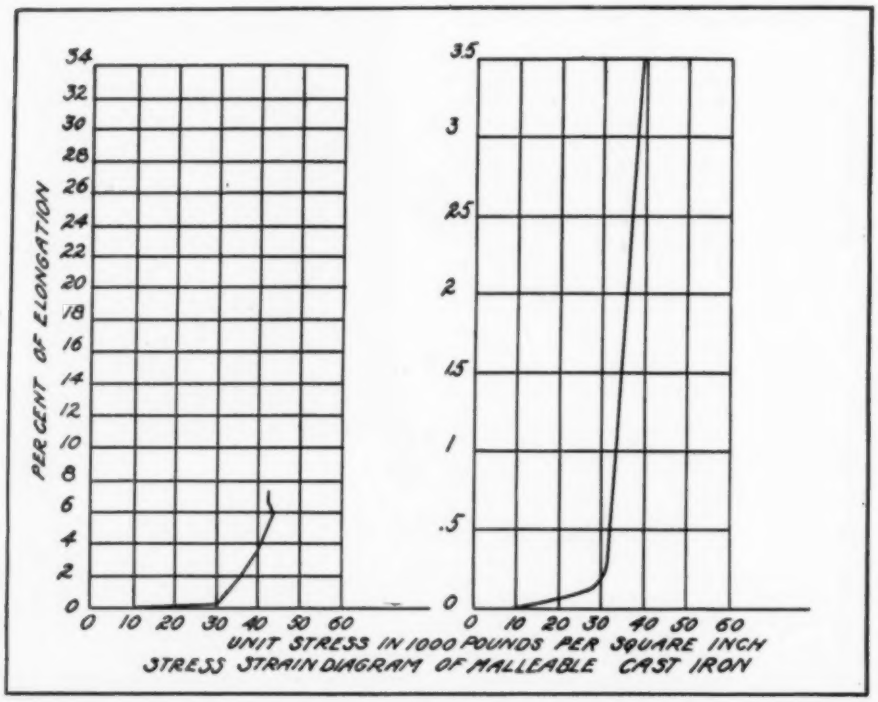


FIG. 14—STRESS-STRAIN DIAGRAM OF MALLEABLE CAST IRON FROM WHICH YOUNG'S MODULUS MAY BE COMPUTED

of alloys just mentioned, and the corresponding reproductions of photographs Figs. 1-5, show the appearances of the fracture of these materials.

Structure of Iron-Carbon Alloys

The character of the structure of these alloys is more clearly shown in the microphotographs Figs. 7-10. Fig. 7 is an unannealed 0.25 per cent carbon steel in which the light areas are ferrite and the grayish areas approach more or less near to being pearlite. In an annealed casting, the structure would not be nearly so coarse but the ingredients present and their relative amounts would be the same. Fig. 8 shows the structure of white cast iron in which the white areas are cementite and the gray background is pearlite. Fig. 9 is malleable cast iron in which the white background is ferrite in the form of a large number of distinct grains whose outlines can be clearly noted and the gray and black blotches are temper carbon. Note that the temper carbon is aggregated into lumps or nodules, which are approximately globular in shape, although at this high magnification it can be seen that they are not really spherical, but merely approach this shape. Fig. 10 is a gray cast iron in which there will be seen three ingredients. There is a light one, quite probably ferrite, a gray one which is pearlite, and these two constitute a background against which are seen a series of dark gray approximately straight lines. These lines are cross-sections of crystals of graphite and the difference between temper carbon and graphite is solely that the one occurs in round masses and the other in particles suggesting in shape the scales of a fish. It is precisely this difference in crystalline form which constitutes the essential difference between the carbon of malleable cast iron and the carbon of gray cast iron, and which accounts for the differences of physical properties of the two materials.

It will be quite obvious that weight for weight graphite will interrupt the continuity of the metallic masses through which it is scattered much more than will temper carbon. Now any one of these materials has properties corresponding to the properties of the metallic matrix of which it is composed, modified by the amount of interruption that is occasioned by the free carbon which is scattered through it. The carbon has no strength and no elongation. So far as the properties of the material are concerned, it represents merely a hole in the surrounding metal and of course, round holes will weaken the castings less than long narrow slots.

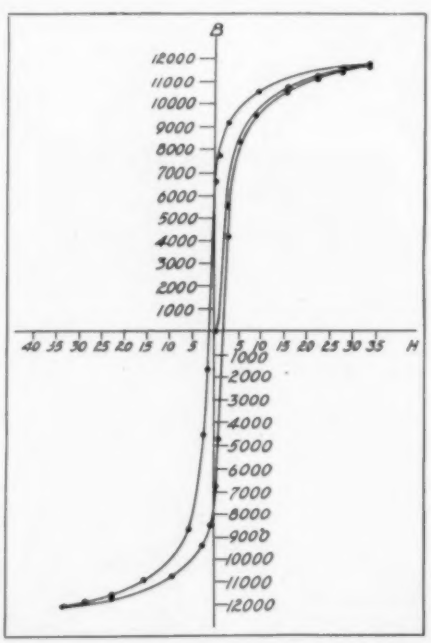


FIG. 15—MAGNETIZATION CURVE AND HYSTERISIS LOOP OF MALLEABLE IRON

From what has been said, it might be expected that cast steel would be stronger than pure iron since it contains pearlite which is stronger than ferrite. For the same reason, its elongation would be less than that of pure iron and its strength would increase and the elongation decrease the higher the carbon of the steel casting. Malleable iron would be expected to possess a fair elongation since it is made up largely of ferrite, but its elongation would probably not be as great as that of pure iron since the temper carbon will more or less interfere with this property. Malleable iron would be expected to be materially stronger than pure iron and somewhat weaker than cast steel. Gray iron would be expected to be more brittle than either malleable or steel, both because the matrix is pearlite instead of ferrite and also because the structure is much weakened by the large graphite flakes.

Ultimate Strength of Bars

In Fig. 11 is shown a series of test bars illustrating the properties of the three materials. All these bars broke with a total load of 16,000 pounds; in other words, the size of the bar was chosen so that the bar should be of the same strength for each material. The upper steel bar had an ultimate strength of 68,000 pounds per square inch and an elongation of 14 per cent; the malleable bar had an ultimate strength of 48,000 pounds per square inch and an elongation of 10 per cent, and the gray iron bar a strength of 22,000 pounds per square inch and no measurable elongation. The malleable bar shown is the American Society for Testing Materials and American Foundrymen's association standard; the two other bars were purposely made of similar shape, though neither represents the proper form of test bar for the material of which it is made.

It is quite possible that the steel bar would have shown a considerable better elongation if a suitable test piece had been used. The three bars show quite clearly, however, the relative size of bars of equal strengths made of the three materials.

Now in engineering design, it is, of course, not possible to load a structure up to the point of failure; indeed, the governing feature is more likely to be the elastic limit. Leaving aside certain controversies of purely engineering interest, the elastic limit might be defined closely enough for the present purpose as being that load to which the material can be subjected without causing it to be permanently deformed.

The lower three bars in Fig. 11 are bars of the same material as are shown on the upper half of the board and are of such dimensions that they each will take a permanent set at the same figure, namely, 12,000 pounds. The elastic limits of the three materials are 46,000 pounds per square inch for the steel; 38,000 pounds for the malleable and 13,000 pounds for the gray iron. In this connection note that although the two malleable bars on the board are the same size, the steel bar having the same total elastic limit as the malleable bar is larger than the steel

bar which has the same strength. In other words the elastic limit of malleable iron is nearer its ultimate tensile strength than that of steel. This property is exceedingly valuable as it permits of the use of safety factors in the case of malleable iron lower than in the case of steel. The extremely low value of the gray iron indicates that this material is unsuitable in any event for loads of the character here discussed.

The Stress-Strain Diagram

The behavior of metal when subjected to tensile stress is often represented by a stress-strain diagram which plots the increase in length of the specimen compared with the corresponding loads. The accompanying diagram, Fig. 14, of malleable iron, while made before the adoption of the present form of bar, will give an idea of the form of curve for this material. From this curve can be derived the Young's modulus of the material. This constant, representing the ratio of stress to strain, is observed by experiment to be nearly constant for all steel no matter what the composition or heat treatment. The value is approximately 29,000,000 pounds per square inch. For malleable it is also 29,000,000 for loads up to about 25,000 pounds per square inch but decreases and is only about 16,000,000 on the curve shown in Fig. 14 at the elastic limit.

Fig. 12 shows the behavior of the three materials in crossbending and compression. The three upper bars were all loaded at the center to 1000 pounds, the span being 12 inches. The calculation of the ultimate fiber stress to which the three bars were subjected is, perhaps, unnecessary in the present connection, the purpose of the exhibit being primarily illustrative. The illustration does not indicate that the three bars are of different widths. As a matter of fact the malleable bar is 1 inch wide, the gray iron bar 0.97 inch wide and the steel bar 0.80 inch wide. It is evident, therefore, that the malleable is slightly weaker than the gray iron and only 0.8 as strong as the steel bar of equal thickness. The gray iron bar, however, broke without any perceptible bend, the malleable bar has merely begun to tear in the lower surface and is not in two distinct pieces and the steel bar does not yet show any rupture but would not have stood a greater load. However, it could have been bent considerably more before breaking had the stroke of the machine been sufficient.

Compression Strains

On the shelf at the bottom of the board are shown samples indicating the effect of compression strains on the three materials. All of these samples were originally ½-inch in diameter and 1 inch high. The three pieces to the left were loaded to 21,000 pounds. The one at the extreme left is steel, and has settled somewhat; the next one is malleable and has settled somewhat more and the third one is gray iron and is so badly shattered that it has to be preserved in a glass tube.

The next sample is a malleable piece which has been loaded to 23,000 pounds and has sheared through but not yet separated into two pieces. The piece at the right is steel, which was loaded to 100,000 pounds, the capacity of the machine, and has merely spread out into a pan cake.

Primarily it is to be observed on this board that the steel and malleable bars deform preceptibly before they are actually destroyed so that articles made of these materials will not break without previous warning.

In addition to the static tests such as have been reported in connection with the samples previously shown, the properties of a material under shock are of considerable importance. These properties are not so easily illustrated as the preceding. There are two kinds of dynamic or shock stresses of interest in this connection. One of these is the effect of repeated small stresses in opposite directions and the other is the resistance to heavy blows. For the former, little data are available and no samples. It is known, however that malleable iron on account of its micro structure resists alternating stresses of this kind. For the purpose of measuring the latter effect a number of tests have been devised. That which is usually applied to malleable iron is the one commonly attributed to the late J. B. Walker of the Erie Malleable Iron Co., Erie, Pa. It consists in striking the point of a wedge of standard form a series of 70 foot-pound blows until the material breaks, or until 20 blows have been struck. The reader is quite probably already sufficiently familiar with this test.

At the bottom of Fig. 13 are shown three such wedges after test. Reading from left to right these are: Steel, malleable and gray iron. The steel and malleable wedges have both been struck 20 blows and have completely curled up. The gray iron wedge has been broken off at the point by the first blow. Measurements of this kind have not yet reached the point where they are quantitatively reliable but the samples here shown will serve to indicate what may be expected of the material.

Of late malleable iron is finding considerable application in the manufacture of iron parts for electrical apparatus, notably field frames for the smaller sizes of motors and generators. Accordingly it is of importance to know the elctro magnetic properties of malleable.

The company with which the writer is connected has dealt with this subject thoroughly in a magnetic and electrical laboratory of its own.

Magnetic Properties of Malleable

The magnetic properties of malleable iron are good when the material is of good quality; these properties are comfortable to soft steel and are exceeded to an important degree only by absolutely pure iron. On the upper part of Fig. 13 will be found three paper circles indicating the cross-sections of steel, malleable iron and gray iron as marked, which will carry equal magnetic flux at saturation; in other words, a cross-section of each of the three materials of the size indicated by these circles, if magnetized to the utmost limit that the material will permit will have the same strength as a magnet for all of the three materials.

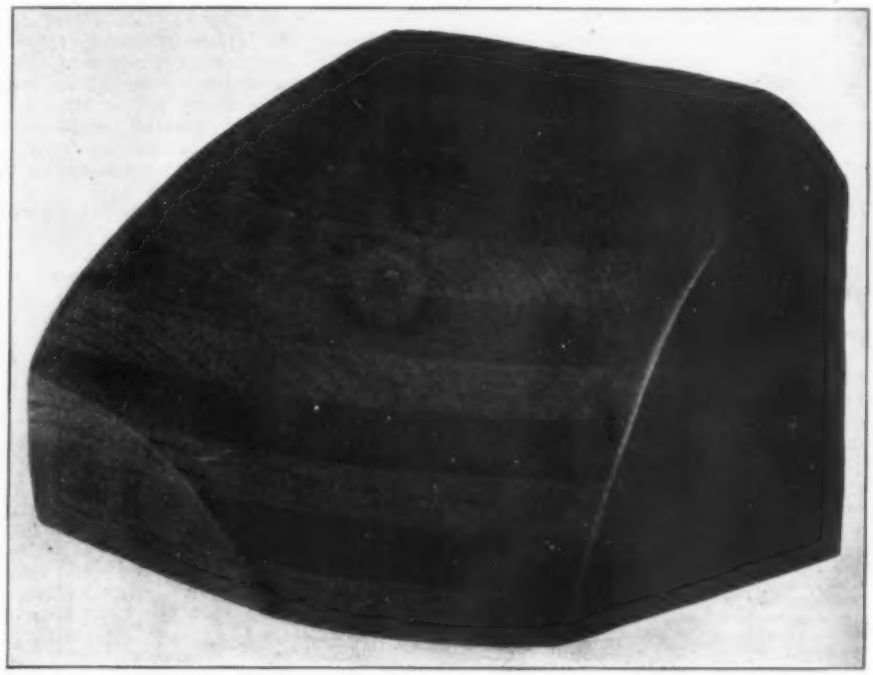


FIG. 16—MODEL ILLUSTRATING EFFECT OF VARYING PROPORTIONS OF SILICON AND CARBON ON STRENGTH OF MALLEABLE IRON

Importance of Permeability

It will be seen that the malleable iron requires relatively a small area for this purpose, much less than the gray iron and but slightly greater than the dead soft steel.

Another point of importance in the design of electrical machinery is the matter of permeability, that is the relation between the electrical energy used in the magnet coils and the resulting strength of field. This is of importance in fixing the efficiency of the magnet and the amount of copper required for its windings. The permeability of all materials varies

according to the intensity to which they are to be magnetized. Inasmuch as the flux density has to be pretty high in order to avoid excessive weight in the iron parts of electrical machinery for comparison it has been assumed that the density desired is the greatest which can commercially be obtained in cast iron.

The three coils of copper wire shown in Fig. 13 indicate the relative amounts of copper which with equal consumption of electrical energy will magnetize equal cross-sections of steel, malleable and cast iron to this flux density. The outer coil corresponds to the cast iron, the next to malleable and the smallest to steel. It can readily be seen that the amount of copper required for the gray iron is incomparably greater than that for either malleable or steel; as a matter of fact, it is 144 times as much as for steel and between 80 and 90 times as much as for malleable iron. For the benefit of those who may be interested in more exact data, Fig. 15 will indicate the magnetization curve and hysterisis loop of malleable iron of suitable quality for magnetic purposes.

The spiral chip which encircles the exhibit on the board shown in Fig. 13 is one continuous turning removed from a malleable casting. It is 24 feet long, not including the increased length due to its spiral form and it is presented here as evidence of the machining qualities of the material.

The figures here quoted are derived from a considerable number of tests and observations which have come to the writer's attention and err if anything on the side of conservatism. They may be taken as entirely safe for the basis of any engineering design when the material is obtained from reputable manufacturers.

The figures are as follows:

*Tensile strength, pounds per square inch	45,000
*Elongation, per cent	7½
*Ultimate fiber stress in cross-bending, pounds per square inch	64,000
Young's Modulus, for loads under 25,000 pounds per square inch	29,000,000
Elastic limit, pounds per square inch	35,000
Strength in compression, pounds per square inch	100,000
Specific gravity	7.4
Intensity of magnetization at saturation, C. G. S. units	11,500
Permeability at this density, C. G. S. units	300
Maximum permeability (at about 6000 lines per square centimeter)	2,000

*Based on A. S. T. M. specifications.

It is unfortunate that almost everyone expects to ask: What is the tensile strength of malleable iron, or the permeability, or whatever else may be under discussion, without an adequate understanding of the fact that malleable iron has been made of a great variety of compositions and anneals, many of them not suited to good work. Even eliminating the variations of compositions and heat treatment due to ignorance alone or to unexpected accidents, and not in accord with good practice, there remains the question of adapting the material furnished to the conditions required.

The properties of malleable iron vary considerably according to the quantities of carbon and silicon which it contains and it is perfectly legitimate to select carbons and silicons which in the judgment of the manufacturer are adapted to the best interests of the customer and which depend on his individual requirements. It is fortunately true that the requirements of most customers can be met by a fairly standardized product. There are, however, particular instances where owing to the peculiarities of individual requirements some advantages must be sacrified. Thus, for instance, great strength is not compatible with small work or intricate designs. Great perfection of surface frequently necessitates a sacrifice in physical properties and so on. The metallurgical details of this matter need not be fully entered upon in this connection; suffice it to say that variations of strength attend variations of chemical composition and that it is the part of a skillful manufacturer of a product to maintain his chemical composition appropriate to the work he is required to furnish.

A high carbon product is necessarily weaker than a low-carbon product. Under certain circumstances silicon also has its effect in decreasing the strength of the material. The user might not and, indeed, should not be interested in the chemical specifications of the product furnished him but should depend upon a statement of the properties he requires in securing a product suitable to his needs.

In Fig. 16 is shown a model which will illustrate qualitatively the changes of strength with varying compositions of iron. In this figure the dimension of the base running upward to the left indicates variations of silicon. The dimension running upward to the right indicates variations of carbon and the strata shown in the block indicate the tensile strength of metal of the corresponding compositions. The block represents in its entirety the whole range in which malleable may well be made. The regions in which the well informed foundrymen operate are toward the rear corner of this block. The figure will show plainly the enormous drop in strength corresponding to the high silicon, high carbon alloys at the near corner of the figure.

There remains now for consideration the question whether or not the manufacturers of malleable iron merit the confidence of the consuming interests in the soundness of their manufacturing methods. This question is, of course, not capable of a general answer for in this as in other lines of manufacture there may be careful and careless producers; there may exist knowledge or ignorance; skill or crudeness.

This prompts the question: What steps do the reputable manufacturers take to safeguard the interests of customers? In the early stages of the art, through ignorance much was left to chance even in the best conducted establishments. In each plant there grew up a small group of men who developed an almost uncanny ability to guess right and upon their guesses depended the quality of the product. These men based their guesses not on any definitely known principles but merely upon an extremely well educated power of observation and a long memory; like Providence they "moved in mysterious ways their wonders to perform", all undaunted by their profound ignorance of any metallurgical principles or even of the fact that there was such a thing as metallurgy.

The well conducted establishment today avails itself of the services of a trained metallurgist either as a consultant or within its own organization. It sets up a system of chemical contral designed to inform it of the composition of all its raw material and its product at appropriate stages of manufacture. It supervises its annealing operations by the highest type of autographic pyrometers. It maintains research facilities by which its metallurgists may inform themselves as to causes of failure and in which experimental work in pure science can be done which has bearing on any of the problems of the industry and it calls into consulation such experts in chemistry and physics as may be required to supplement the knowledge of its own staff.

Many writers, notably Enrique Touceda, have pointed from time to time to the fact that but a few years ago much malleable was sold with a tensile strength far below 40,000 pounds per square inch and have pointed to the consistent improvement to the present 45,000 pounds, with 7½ per cent elongation which is now generally exceeded very considerably.

Mr. Touceda's figures are avowedly representative as nearly as possible of the malleable industry as a whole and not of any particular plant. In 1903 there was established under the writer's supervision the first chemical laboratory operated by a malleable foundry. About two years were consumer perfecting the methods, and organization and in focusing attention upon the proper points. In this laboratory there are at hand analyses and tests of each heat made in the past 13 years—about 50,000 or 60,000 in all. In that time the records do not show any interval in which the product averaged as low as 40,000 pounds per square inch. The average for this series was between 45,000 and 46,000 pounds per square inch. Elongations are unfortunately not available but it can be said that these results were not accomplished at the expense of that property.

In the last few years continued research has been productive of great improvements in the plants which come under the writer's notice. Turning to more recent times one corporation was occupied with certain ordnance work at five different plants for a period of about four months. The government specifications were those of the American Society for Testing Materials and in that time not a single heat was condemned at any of the plants for not conforming to specifications either by the government inspectors who conducted the tests or by the company's laboratories.

Runs Pattern Factory

A new unit in the manufacture of foundry supplies has appeared in the jobbing pattern plant now being operated by the Johnston Pattern Co., Canton, O. The business has been organized on a national basis to meet the requirements of foundries no matter where located. Through the efforts of the sales production department, patterns made to order are being shipped to all parts of the country. H. P. Johnston is general manager of the company.

Stellite Developed by Arc Furnace

Hard Tool Alloy Now Produced in Commercial Quantities in Electrically-Heated Crucibles—Electrical Method Offers Advantages and Raises Interesting Technical Problems—Output is Increased

BY ELWOOD HAYNES

WHEN the gasoline automobile passed the experimental stage and became an economic necessity the demand for cars compelled automobile manufacturers to seek new means to increase production. The growth of production facilities did not keep pace with the demand for cars with the result that there were two buyers for each car manufactured. Automobile and motor truck parts manufacturers faced the same situation.

Hundreds of men were added to payrolls and acres of floor space were added to plants. The necessary tools could not readily be obtained so the problem resolved itself into that of getting the highest possible production from existing equipment. Many new alloys and special tool materials were tried with varying degrees of success. New ways of machining also were tried, new machine-tool operations replaced old ones, new machine parts were designed but still production lagged too far behind needed output.

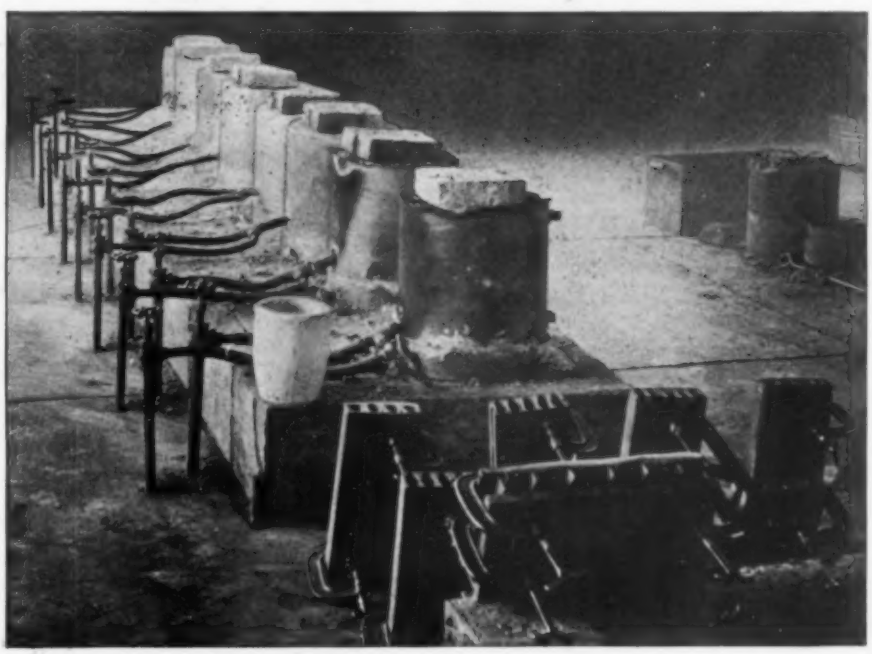
This led to laboratory experiments to find a material other than steel for cutting tools, a material that would enable the machine operator to do more work in less time. It was known that certain of the semirare metals could be made into cutting tools but the right combination of hardness and strength had never been obtained. Laboratory work was begun with the definite object of utilizing these semirare metals and obtaining the proper cutting-tool qualities by adding a third element. Working out this idea required a great deal of labor but a combination of metals was found that gave desired results. These experiments resulted in the first production of stellite. The name is derived from the Latin stella, a star, because when the alloy is polished it has a beautiful silvery luster. The first experiments in the development of stellite were to make an alloy that would be sufficiently hard to stand up under heavy cuts. Although, at first, there was some difficulty in obtaining the strength and getting a hard cutting edge the experiments showed that chromium, cobalt and tungsten of which stellite is made could be alloyed in such a way as to give desired results. In 1912 the experiments culminated in the perfected laboratory production of stellite.

Stellite is an alloy of these semirare metals but contains no iron and cannot properly be termed steel. The binary alloy consisting essentially of cobalt and chromium can be forged with difficulty at a bright red heat, but when it becomes cool its hardness remains as great as before the first heating. Stellite does not get harder as it gets hotter but gets tougher and holds the cutting edge longer. Cobalt is not affected by heat up to about 1900 degrees Fahr., and tungsten and chromium are not affected by heat up to 2600 or 2800 degrees. It is clear that the cobalt becomes tougher up to the degree of softening but at the same time the other two metals are not changed. This makes a closer and tougher bond, eliminates all chance of crumbling and makes the tool last longer, because it has the necessary strength to take off a heavy cut without breaking.

The laboratory production of stellite gave no promise of commercial production on a large scale because of the melting conditions that were found to be essential. Because of difficulty in obtaining sufficiently high temperatures for commercial use quantity production of the alloy was not started until 1913. In 1914 stellite was manufactured in three grades, the first for turning steel up to 0.30 per cent carbon, the second for general purposes and the third for work on hard castings. Gas-fired crucible furnaces were first used for melting purposes. Each crucible held a 15-pound charge and the melting required an hour and a half. The crucibles lasted two or three heats and then had to be discarded. Sixteen of these gas furnaces were installed but the small capacity of the crucibles, the time required for melting and the high cost of crucibles made the installation unsatisfactory.

Several further experiments were made with different melting furnaces. The electric furnace seemed to be better adapted for the purpose so an electric resistance furnace was installed. This held an 80 or 90-pound charge and required less time per heat than the gas-fired crucibles. Enough was learned from this first electric furnace installation, to show that this type of melting equipment seemed to hold the greater possibilities for commercial development.

After further study of electric furnaces an arc-type furnace was installed two years ago. It is a Snyder furnace of 125-pound capacity. It is connected to a 110-volt power line fed by the Kokomo, Ind., central station. The furnace was built for 50 kilowatts but was changed in the plant of the Haynes Stellite Co., to 100 kilowatts so that it is now operating on a 100 per cent overload. The lining of the furnace is basic and is in good condition after having been in use more than 14 months. More than 2500 heats have been taken out. A second Snyder furnace was installed six months after the installation of the first, and a third six months later. Each is of 500-pounds capacity, 125 kilowatts. The three furnaces have a capacity of more than



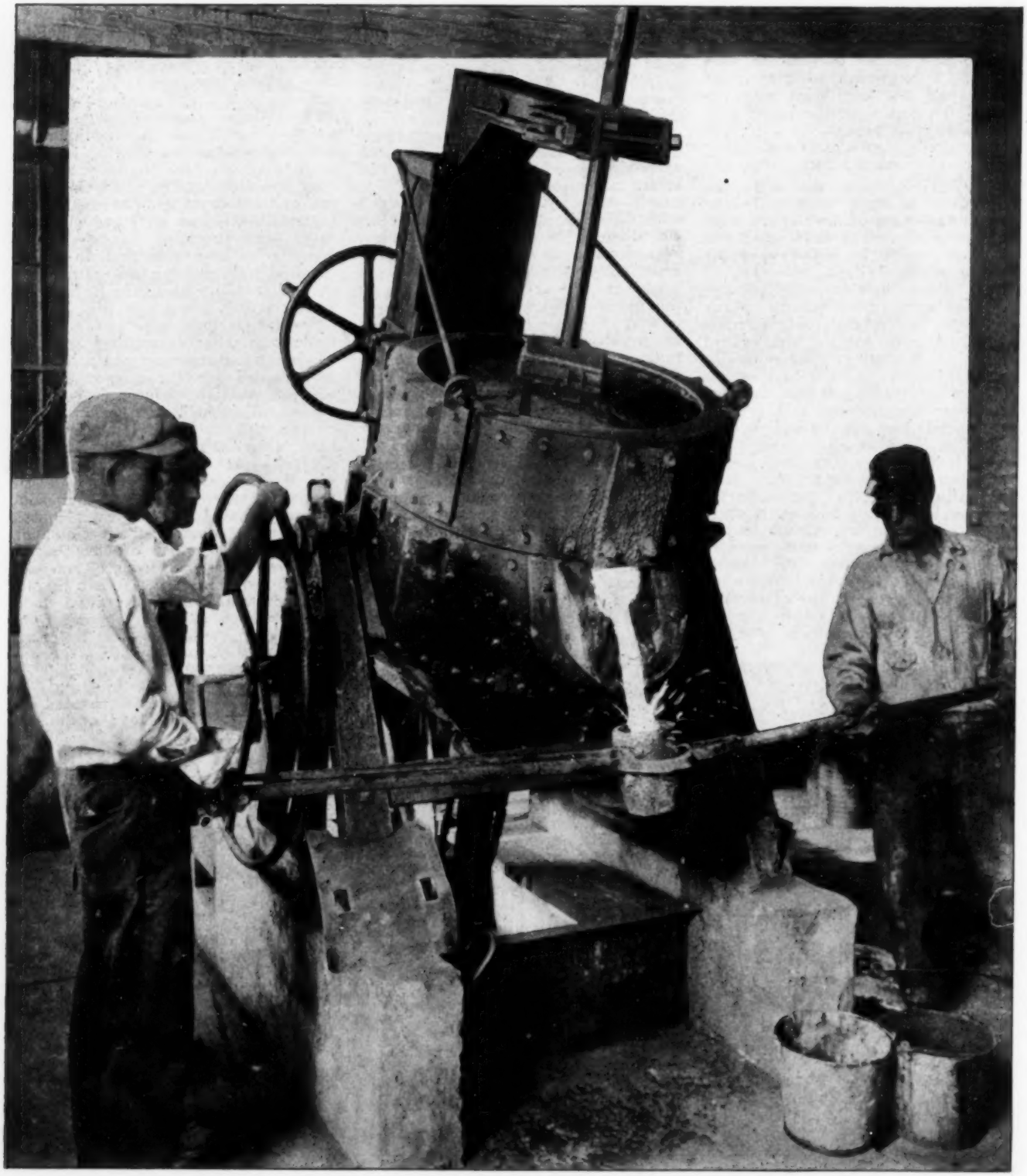
GAS FURNACES WERE ORIGINALLY EMPLOYED FOR MAKING STELLITE

four tons of metal in 11 hours so that stellite is now being made exclusively by the electric process. The cost of power, labor and lining with this equipment is less than the cost of crucibles alone with the gas furnaces, per pound of metal melted. Power consumption averages about one-third kilowatt per pound of metal melted which makes the melting cost much lower than was expected before the installations were made. The linings have given good service. Graphite electrodes are used, averaging two to three electrodes per week per furnace on steady operation. These were found to give better results for this purpose than the usual carbon electrodes.

Electric Furnace Aids Output

These furnaces have greatly increased the production of stellite because bigger charges are possible and the melting time required per heat is only about 30 minutes. Better metal is also possible because of the higher temperatures, as certain chemical combinations are formed that cannot be obtained at the lower temperatures.

The United States government has decided to buy 2500 to 3000 acres near Pittsburgh as a site for a new town to house workmen of the Neville island ordnance plant. From 4000 to 5000 homes and a sufficient number of stores and other buildings to house and provide amusement and necessities are planned.



THIS IS THE FIRST ELECTRIC FURNACE TO BE EMPLOYED IN THE MANUFACTURE OF STELLITE—IT IS STILL IN USE AFTER 2500 HEATS

Allied Metals Meeting is Historic

Extensive War Utilization of Foundries is Brought to Practical Basis—Semi-Steel Shell Program Formally Launched—Use of Motion Pictures for Military Training is Demonstrated—Attendance Greatest in History

UNITED application of the foundry capacity of the country to the direct needs of the war on a scale far outreaching that undertaken up to this time was materially advanced at the Allied Metals congress at Milwaukee, Oct. 7 to 12, in which was joined the twenty-third annual meeting of the American Foundrymen's association. Military representatives presenting the government's tremendous requirements in a definite and comprehensive fashion, found the casting manufacturers of the country assembled in greater numbers than on any previous occasion in history, eager and willing to meet every demand of the nation that is within their resources or power to fulfill. In this comingling of emergency necessity and patriotic resolve, there was represented the most intimate contact on a broad scale between the government at war and the foundry industry yet established with its promise of far-reaching results in the months to come both for the stability of the industry and for the advancement of the war program.

Not only in size was the convention a notable one. The outstanding features, in fact, were many. Chief among these was the formal launching before the foundry industry of the great semisteel shell program, plans for which the government gradually has been maturing. The session at which the scope and character of the ordnance department's plans were disclosed was marked by the largest attendance of the entire congress and by the display of intense and enthusiastic interest. The international bearing and importance of the American cast shell program was reflected by the presence of technical experts of the French army. The use of motion pictures in developing proficiency and correct methods both military and industrial, was demonstrated by Maj. Frank B. Gilbreath, through a remarkable exhibition of films employed at the Ft. Sill school of arms. The operations and mechanical features of the Lewis and Browning machine guns were visualized with scientific accuracy and precision.

The exceptional and national importance of the meeting was emphasized by the unusually comprehensive program of papers presented, dealing with many phases and problems of present war production; by the speakers of national prominence especially at the Thursday evening banquet; and by the general spirit of practical patriotism and of militant Americanism which those in attendance brought into every action or discussion.

Boosting Essential Foundry Production

ON Tuesday, C. S. Koch, cannon section, production division, ordnance department, Washington, discussed the "Activities of the Army Ordnance Department, Especially as Applied to Foundry Matters." He pointed out that the ordnance department in less than 18 months has become the greatest single business organization in the history of the world. This growth necessarily has been accompanied by numerous mistakes which could have been avoided if the time element had not been of paramount importance.

When the country entered the war, Mr. Koch stated, the ordnance department had only 273 members, of whom 83 were commissioned officers. At the present time there are 46,000 persons in the department. The number of contracts executed in the past year and one-half has been more than 20,000. Of these contracts, the great foundry industry has probably less than 200, a fact which gives a clearer insight into the immense scope of the department's activities.

Mr. Koch urged upon foundrymen and other groups of manufacturers the importance of organizing groups to consider in detail problems connected with production. Manufacturers producing similar products could facilitate the work of the ordnance department and smooth out their own difficulties by interchange of experiences. This method, he felt, would greatly lighten the strain on the ordnance department. He urged a keener appreciation of the difficulties under which the ordnance officials are laboring in building up an organization.

No Coal Congestion

E. D. Brigham, manager iron ore, coal and grain traffic, United States railroad administration, Duluth, was unable to be present but a paper prepared by him for the occasion was read, giving a very favorable outlook for transportation conditions this winter.

"You will all recall," said Mr. Brigham, "what we had to contend with last winter—the service was bad, and because of lack of preparation, there was great congestion on nearly all railroads. We will see no repetition of it this winter. Under Mr. McAdoo's orders, and his co-operation with Mr. Garfield, the coal question is solved. You will get your supply. There may be some delay to nearby points, but it will not be serious."

Maj. Frank B. Gilbreth, Providence, R. I., brought the joint session to a close with a talk, illustrated with military moving picture films designed to present the most modern methods of transferring skill. The ability of a teacher to impart his knowledge is not constant whereas the graphic representation of a lesson once printed on the moving picture film remains the same and can thus be taught to workmen repeatedly in the best manner.

To illustrate the principle, several moving picture films were displayed showing how to strip and assemble a Browning machine gun and how to operate such a gun in actual warfare. The pictures were made by the army war college for the instruction of mechanics and soldiers in the American army. Following out the same principle, films were shown illustrating the construction and operation of rifle grenades and of trench mortars. These moving pictures consisted in part of phantom or sectional drawings which vividly illustrated the actual working of the internal mechanisms of bombs, grenades, etc. The results were so conclusive that the pictures and the talk given by Major Gilbreth brought forth repeated applause.

It was acknowledged that the cost of preparing these "moving lessons" is great. The pictures displayed were photographed by an expert cameraman whose salary was $20,000 a year, but who accepted a $30 a month government enlistment. If industries should take up this method of in-

structing their workmen it would naturally be too expensive for any individual firm. Major Gilbreth suggested that the expenses should be met by the government or by associations of industries working in concert to improve the skill of their workmen.

President Fuller appointed a nominating committee, of which Maj. L. L. Anthes, Anthes Foundry, Ltd., Toronto, Ont., is chairman. The other members are: A. E. Howell, Phillips & Buttorff Mfg. Co., Nashville, Tenn.; V. E. Minich, American Foundry Equipment Co., New York; S. T. Johnston, S. Obermayer Co., Chicago; and W. A. Janssen, Canadian Steel Foundries Ltd., Montreal, Que.

The committee on resolutions also was appointed. The members are: John A. Penton, Penton Publishing Co., Cleveland, chairman; C. R. Messinger, Sivyer Steel Casting Co., Milwaukee; and A. E. Howell, Phillips & Buttorff Mfg. Co., Nashville, Tenn

Tuesday afternoon and evening were devoted by the foundrymen to inspections of the exhibits and to the enjoyment of the various entertainment features which had been arranged.

Discuss Production Problems

Subjects of general interest to foundrymen were discussed at the general session held by the American Foundrymen's association on Wednesday morning. These included problems of sand-blast installations, the work of foundry engineers, women in the foundry, foundry dust problems and the commerce of coke.

H. D. Gates, Pangborn Corp., Hagerstown, Md., presented a paper on "Selecting the Sand-Blast Equipment for the Foundry". In common with other discussions presented during the week, this paper disclosed the savings in manpower possible through the wider adoption of mechanical equipment. Conservation of labor has become a duty, Mr. Gates pointed out, and an efficient sand-blast installation offers possibilities of making this duty a financially profitable venture.

"Engineers—Their Relation to the Foundry in the Saving of Labor," was discussed by E. S. Carman, Cleveland-Osborn Mfg. Co., Cleveland. This paper was presented in full in last week's issue.

H. L. McKinnon, C. O. Bartlett & Snow Co., Cleveland, in discussing this paper, pointed out the fallacy of wasting the time of engineers and draftsmen in perfecting designs for individual castings of which only a small number are required. He favored a greater analysis of designing problems, however, where large numbers of castings of the same type are to be made.

Employment is the factor that looms largest in the foundry industry, according to C. E. Knoeppel and M. J. House, C. E. Knoeppel & Co., New York, in a paper on "Women in the Foundry". In the absence of the authors, the paper was read by title.

H. D. Egbert, Research Corp., New York, discussed "The Cottrell precipitation Process and Its Application to Foundry Dust Problems". Electrical precipitation is employed in collecting dust from sand-blast tumbling barrels, grinding wheels, etc. Two sets of electrodes comprise the principal elements of the precipitator. These are of opposite polarity and are shaped so that a silent or glow discharge is maintained between them by supplying the discharge electrode with high voltage direct current. In cleaning, the air or gas passes between these electrodes and the dust particles, becoming charged with static electricity, are assembled on the collecting electrode.

GREETING DIRECTOR GENERAL SCHWAB AT MILWAUKEE.

From left to right—John A. Penton, publisher The Iron Trade Review; Mr. Schwab, Mrs. Schwab, Theodore Vilter, chairman, Milwaukee committee, and A. O. Backert, president, American Foundrymen's Association.

New Officers

American Foundrymen's Association.

President:

A. O. Backert,
The Penton Publishing Co.,
Cleveland.

Vice President:

W. A. Janssen,
Canadian Steel Foundries, Ltd.,
Montreal.

Secretary-Treasurer:

C. E. Hoyt,
Chicago.

Directors

(In addition to the above)

H. R. Atwater, Cleveland-Osborn Mfg. Co., Cleveland.
W. R. Bean, Naugatuck Malleable Iron Works, Naugatuck, Conn.
Henry A. Carpenter, General Fire Extinguisher Co., Providence, R. I.
H. E. Diller, General Electric Co., Erie, Pa.
Alfred E. Howell, Phillips & Buttorff Mfg. Co., Nashville, Tenn.
S. T. Johnston, S. Obermayer Co., Chicago, Ill.
C. S. Koch, Fort Pitt Steel Castings Co., McKeesport, Pa.
W. G. Kranz, National Malleable Castings Co., Cleveland.
C. R. Messinger, Sivyer Steel Casting Co., Milwaukee.
V. E. Minich, Sand Mixing Machine Co., New York.
J. P. Pero, Missouri Malleable Iron Co., East St. Louis, Ill.
H. B. Swan, Cadillac Motor Car Co., Detroit.

Foundries will have enough coke for capacity operations this winter, according to J. A. Galligan, Pickands, Brown & Co., Chicago, who discussed "The Commerce of Coke". "About 100,000,000 more tons of coal will be required this year than last," said Mr. Galligan. "Increased production will supply half of this, the remainder coming from a saving of 35,000,000 tons by industries and 15,000,000 tons by homes. Foundrymen can realize the volume of the coal traffic by recalling that an average 8-day coal movement equals a season's grain movement; a 32-hour coal movement equals a season's cotton movement. The coal dug annually equals the excavation involved in 2¼ canals the size of the Panama canal, the coal being carried an average of 300 miles."

In the discussion of foundry costs following the presentation of the report of the association's committee on costs, a plea for better and standardized costkeeping methods was made in order to avoid a *post bellum* condition in which American foundries, with high labor costs, would be unable to sell outside this country. The number of subscribers to the association's standard cost system has increased during the past year from 102 to 117 members.

Pig Iron Shortage to Continue

The pig iron situation which the foundry industry is facing at the present time was analyzed by C. J. Stark, editor, The Iron Trade Review, in his paper "Sale and Distribution of Foundry Iron Under War Conditions," which was presented at the gray-iron session

Thursday morning. This paper is published in full in this issue.

Casualties in American industries today are equal to the casualties sustained by an army of 2,700,000 men fighting under modern conditions in front line trenches, according to Victor T. Noonan, director of safety, industrial commission of Ohio, Columbus, O. Mr. Noonan made this statement while presiding at the session on safety and accident prevention at the foundry convention. Statistics of Ohio show that the accidents occur most frequently to men between the ages of 21 to 41, the draft age. This is a matter which it was agreed demands attention especially during war times.

The new sanitation code prepared by the committee on safety, sanitation and fire prevention, relating primarily to safeguards for the health of workmen, was adopted and a tentative report on fire prevention also made by the committee was withheld for further study. A more comprehensive report on fire prevention will be presented at the 1919 convention.

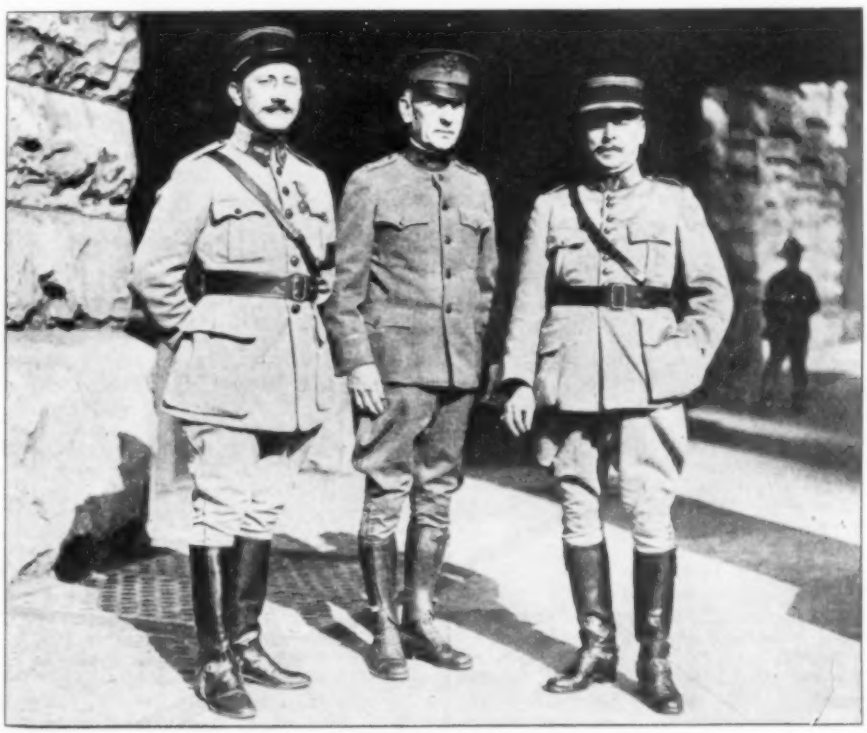
Fred M. Wilcox, vice president, industrial commission of Wisconsin, Madison, Wis., recounted some of the advantages obtained by both employers and employes from the adoption of safety appliances and methods.

Before closing the session Mr. Noonan announced that the bureau of standards, Washington, has signified its intention of standardizing industrial codes. It is intended to take the code of the American Foundrymen's association as a basis for a standard foundry code to be applied in each state.

The win the war spirit reached its greatest enthusiasm at the banquet held Thursday night when Charles M. Schwab, director general, Emergency Fleet corporation, and other notables made addresses. Over 500 people were seated in the hall and hundreds crowded the corridors outside waiting for hours for the opportunity of hearing the prominent speakers.

Hands Across the Sea

ASSURANCES that the United States is at last producing munitions, especially shells, in quantity, were first made known at the convention by capable authorities, the experts from France attached to the French Technical mission who have come to this country to advise us in technical details of production. The members of the mission present in Milwaukee included Captain Guillemin and Lieutenants Laurent and Blanchet. Wearing the Croix de Guerre, Lieutenant Laurent expressed admiration for the progress made by American manufacturers in turning out ammunition to drive the Huns out of France and Belgium. Captain Guillemin, head of the commission does not speak English. The two distinguished visitors were accompanied by Capt. O. C. Hall, of the American army. France, said Lieutenant Laurent, began the production of semisteel shell some time ago. By using semisteel shells, he said, it is possible to put more plants at work and to use the small plants. The technical commissioners hope to co-ordinate the raw material resources of the United States to the military requirements. They were sent to the United States to deal with munition problems in general but especially with guns, carriages and shells. The semisteel shell problem, however, has until now occupied practically all of their time. He also mentioned the problems incident to the manufacture of artillery caterpillars.



DISTINGUISHED FRENCH OFFICERS ATTENDED THE CONVENTION.
From left to right—Lieutenant Laurent of the French Technical Mission; Capt. O. C. Hall of the United States Army Ordnance Department; Captain Guillemin of the French Technical Mission, in charge of the French officers assigned to the Milwaukee convention.

American Co-operation Wins

This monumental task of building ships, of providing munitions and other necessities of war, Mr. Schwab said, was due to the co-operation met on all sides. He spoke especially of the co-operation of the press, and most particularly of that of the trade press. He expressed warm appreciation for American women and the assistance they have given in industry.

The experience the country is now undergoing, Mr. Schwab said, is leading to a new spirit of democracy where service rather than wealth will count most. He told of the pride he had in the work he had done at Bethlehem. Should Bethlehem be wiped out completely by the war, Mr. Schwab declares he would have the satisfaction of feeling that he had done his duty and therefore was amply compensated in the satisfaction that brings.

During the first year of the war Mr. Schwab said the Bethlehem works shipped to Europe as many shells as all England produced. The war, Mr. Schwab concluded, will be won largely by the men working in the iron and steel industry.

These general accomplishments of industry was made following a spirited account of what England is doing on the battlefront by Maj. A. Radclyffe Dugmore, of the British army.

Calls Strikers Murderers

Major Dugmore directed his remarks against the workmen in the essential industries who persist upon going on strikes. A striker in war times, he declared, is a murderer; he is prompted to strike either because he is ignorant of conditions or he is swayed by pro-German sentiment. The Somme offensive cost the British 560,000 men, between July and December, 1916. Were it not for the English woman-power back home, he said, the man-power of the British would have been reduced to one-fourth.

Major Dugmore mentioned briefly some of the aid England has given American troops in the matter of coal supplies. Last winter the British supplied our troops with 600,000 tons of coal, despite the fact that coal is very scarce in England. This winter the British coal rations to homes will be limited to one-half ton a month, with electric lights and similar conveniences included.

Shipbuilding Record

W. H. Blood, Jr., assistant to the president, American International Shipbuilding Corp., gave an illustrated talk on the work done at the Hog Island shipyard, which, he said, is destined to be counted as one of the greatest engineering accomplishments of the age. It is now expected to complete all the 180 ships awarded within 24 months after the ground was broken for the plant.

At the concluding session on Friday, questions relating to sand and pouring were discussed in considerable detail. A paper by Henry B. Hanley, New London Ship & Engine Co., Groton, Conn., describing an effective means of improv-

ing the quality of foundry sand mixtures, was read. Several slides illustrating methods of analysis and mixing together with microscopic views of sand in the various stages of the mixing process by means of the muller were shown.

The resolutions committee reported and the convention adopted a resolution of thanks to the Milwaukee chamber of commerce. Proper recognition was taken of S. Griswold Flagg, III, vice president of the association, who resigned to enter the government service, and also resolutions of regret over the death of W. J. Keep, the noted expert in foundry practice, were adopted by a rising vote.

After the new officers of the association were installed it was unanimously agreed to place the name of the retiring president, Mr. Fuller, who has also recently retired from foundry business, upon the list of honorary members.

Milwaukee Is Host

Headed by Theodore O. Vilter, chairman of the executive committee, the various local entertainment committees provided several enjoyable occasions for the visiting ladies. Tuesday afternoon automobiles were furnished by Milwaukee citizens and the guests were conducted on a tour in and about the city. Tuesday evening a reception and dance was held in one of the spacious halls of the auditorium. Wednesday noon, the ladies were tendered a luncheon and Wednesday night, the entire Majestic vaudeville theater was reserved for the visiting delegates and guests. Thursday afternoon completed the schedule of entertainment provided by the local committee, when a card party and tea for the ladies was held in the Badger room of the Hotel Wisconsin.

Facts on Semisteel Shell Production

BEFORE what was undoubtedly the largest gathering of foundrymen ever held in America, the problems of semisteel shell production were discussed on Thursday afternoon by French and American ordnance officers. This session was arranged after the convention commenced on account of the tremendous interest in the subject of shell manufacture in foundries. John A. Penton, publisher of THE IRON TRADE REVIEW and *The Foundry*, presided at the meeting in his capacity of chairman of the semisteel shell committee on manufacturing practice. In his opening remarks, Mr. Penton paid a glowing tribute to France for her wonderful work in the manufacture of artillery and munitions.

The technical features of the afternoon's program were opened by Capt. H. M. Huxley, engineering division, ordnance department, Washington. Captain Huxley said the government expects to order several million semisteel shell ranging from 75 to 240-millimeters, or from about 3 inches to 9½ inches in diameter. The necessity for extreme care in the manufacture of semisteel projectiles was emphasized by Captain Huxley and the grave results which may follow the failure of a single shell were pointed out.

The French technical mission was represented at the meeting by Captain Guillemin and Lieutenants Laurent and Blanchet. Lieutenant Laurent read a prepared address dealing with the metallurgy of semisteel shell on behalf of Captain Guillemin, who is unable to speak English. Lieutenant Laurent traced briefly the history of the semisteel shell. The superior fragmentation of semisteel as compared with cast iron was pointed out. Lieutenant Laurent also explained the principal feaures of the French specifications which provide for a tensile strength of 35,500 pounds per square inch and for a Brinnell indentation 4.25 millimeters in diameter made by a 10-millimeter ball subject to a pressure of 3000 kilograms for 30 seconds. The combined carbon in the mixture, said Lieutenant Laurent, should usually not be less than 20 per cent of the total carbon, and the silicon should be as low as consistent with suitable machining qualities. The emperical rule, total carbon plus silicon equals 4.50 per cent or less, should be observed in preparing the cupola mixture. Lieutenant Laurent also said that aluminum is used as a deoxidizer, not to exceed 0.01 per cent. Lieutenant Laurent recommended making the molds on jar ramming machines, explaining that in France the dry-sand process using a two or three part flask is employed. The molding sand consists of two-thirds new sand and on third old sand.

F. B. Howell, head of the research department of the American Radiator Co., now connected with the ordnance department in an important capacity, described the practice of the American Radiator Co. which is based on its extensive experience in its plants in England and France. Mr. Howell also showed a large number of lantern slides which thoroughly illustrated every detail of the molding process. He laid special emphasis on the necessity for taking great care in making the cores, since the success of the shell to a very large extent depends on the degree to which the core successfully performs its function.

The shells are cast in one-part flasks in the green-sand molds, there usually being four shells in a flask, nose down, a drop gate of the trainer type being employed. The flask and pattern equipment, Mr. Howell pointed out, should be made of cast iron and specially designed for the work in hand. The larger shell also may be cast in single flasks. A course, open, lightly bonded molding sand should be employed. The flask is not rolled over during the operation of making the mold and the ramming is effected on a plain jar-ramming machine. A dry-sand pouring basin takes the place of the cope, this basin containing a strain gate. The riser has the same diameter as the butt of the shell and a height equivalent to the diameter.

The shell may be cleaned on the outside by tumbling, said Mr. Howell, although they are hard on tumbling mills. They also may be cleaned on the inside by means of a stiff wire cable, 5/8-inch in diameter, mounted vertically in a rapidly revolving spindle. This cable is whirled around the inside of the shell at a high rate of speed thus quickly removing the core sand.

The principal operations involved in machining the shells also were explained and illustrated by Mr. Howell, including centering, tapping, turning, banding, painting, etc. At the conclusion of the meeting, Captain Huxley answered questions put by the audience. He said that at present the government does not believe it is practicable to award semisteel shell contracts unless the contractor is in a position to handle 1000 shells per day, or in other words, to melt from 60 to 75 tons of metal. There might, however, be special exceptions, he stated, adding that it is the intention of the department to furnish as many foundrymen with orders as possible.

Urge an Unconditional Surrender

LEADERS in the American iron and steel industry pledged their united resources to the complete overthrow of German military power at the opening session of the Allied Metals congress at Milwaukee. Great applause was given to a resolution placing this pledge before President Wilson, the resolution being given unanimous approval. This action, coming in the midst of Germany's latest peace maneuver, carried a significance which was clearly understood by all.

Germany's abject and unconditional surrender is urged in the resolution, which was telegraphed to the White House. The resolution follows:

Hon. Woodrow Wilson,
President of the United States,
Executive Mansion,
Washington, D. C.

Resolved by the American Foundrymen's association, the Institute of Metals division of the American Institute of Mining Engineers, the Iron and Steel section of the American Institute of Mining Engineers, the American Malleable Castings association and the foundry equipment manufacturers of the United States in joint meeting assembled,

That every resource of these allied metal trades is again pledged to the government not only in the production of materials for the conduct of the war, but for the accelerated manufacture of these materials to enable the government to greatly intensify its prosecution of the war and to bring about a speedy and crushing defeat of the enemy that will lead to his abject and unconditional surrender.

New Light on Ordnance Steel Problems

THE active interest taken by foundrymen in ordnance steel problems was shown clearly by the splendid attendance at the steel session held Thursday morning, at which various phases of ordnance manufacture were discussed. C. R. Messinger, Sivyer Steel Casting Co., Milwaukee, was chairman.

Discussion of ordnance steel manufacture was introduced by the presentation of two papers, "Ordnance Steel for the Army and Navy", by John Howe Hall, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., and "Meeting Specifications for Army Ordnance Steel Castings", by Capt. E. R. Swanson, ordnance department, inspection division, Washington.

At the convention a year ago ordnance steel manufacture was comparatively new to many foundrymen and the subject was being approached in an experimental manner. At the meeting at Milwaukee, the discussions were participated in actively, but the large number of foundrymen present who had successfully mastered the problem during the previous year, thus affording opportunity for recitals of actual experiences.

Captain Swanson's and Mr. Hall's papers were presented in last week's issue. C. S. Koch, Fort Pitt Steel Casting's Co., McKeesport, Pa., stated that the annealing problem has proved most troublesome to foundrymen. Close attention in providing the correct equipment is essential. The ordnance department has considered the establishment of set rules for annealing but has decided against this plan owing to the wide variety of equipment. "A good annealer," said Mr. Koch, "is just as essential as a good chemist."

Steel of either No. 2 or No. 3 grades can be made by the open-hearth, electric, converter or crucible process, Mr. Koch pointed out. Some converter foundries had not thought this possible. He explained that from his experience he believed an electric steel foundry and a converter foundry are making the best records of any casting plants in the country engaged in ordnance steel production. This results more from the manner in which these foundries are managed than from any inherent advantages in these processes. Few open-hearth plants are at work on government steel. Converter foundries found some difficulties before army specifications were changed, unless they were assured of good coke.

Is Double Annealing Necessary?

T. S. Quinn, Lebanon Steel Foundry, Lebanon, Pa., in discussing the practice at his plant, stated that only electric steel is being made. Accurate pyrometric control is maintained. In starting work on ordnance steel, low carbon and high manganese stock was used and this plan is still in effect. Double annealing is employed, every heat being air quenched and drawn in order to avoid rejections. From 60 to 70 per cent of the plant's output is ordnance steel, and on an average not more than three heats are lost monthly on the first test.

C. Inglis, Milwaukee Steel Foundry Co., Milwaukee, explained that its practice formerly called for double annealing but in order to promote production, this was abandoned and equally good results are now obtained with only one anneal. The annealing temperature was 1525 degrees Fahr., the castings being cooled slowly in a closed furnace. Out of 2000 heats, he stated not more than six went back for retreatment.

I. Brejowiski, production division, ordnance department, Washington, urged the importance of each foundry developing its own method, rather than for an electric steel foundry to endeavor to copy the practice of a converter plant. Mr. Koch in reply to a question, stated that it has not been demonstrated that an electric furnace must use higher carbon stock than a converter. Some electric steel plants use material running from 0.30 to 0.50 per cent carbon to secure No. 3 steel, while some converter plants use from 0.30 to 0.40 per cent carbon to obtain the same grade. In discussing ingotism, Captain Swanson stated that in annealing, if the steel is brought beyond the critical point, all traces of this trouble will disappear.

Captain Swanson in the discussion of his own paper pointed out that the best steel castings are required and that the ordnance department cares only for results. In heat treating, the average foundry has had difficulties because the subject was imperfectly understood before the war. "Heat treatment," he said, "applied intelligently will work wonders. The foundry first must know its analyses. The best foundries are now installing new annealing facilities, and are providing intelligent supervision."

"Making Steel Castings on the Pacific Coast" was the title of a paper presented by J. D. Fenstermacher, Columbia Steel Co., San Francisco. He traced the development of the steel castings industry on the western coast and the problems peculiar to that district. Operations at the Columbia plant were described in THE IRON TRADE REVIEW a year ago.

Discuss Metallurgy of Malleable Iron

GREAT progress in methods of production during the past year was indicated by the papers presented at the malleable iron session held Thursday morning. The attendance at this meeting was large and the interest of manufacturers in the development work carried on under direction of this section of the American Foundrymen's association was evidenced by the active discussion of all the papers read. W. R. Bean, Eastern Malleable Iron Co., Nangatuck, Conn., presided in the absence of J. P. Pero, chairman, whose train was late.

Specific engineering data relative to the properties of malleable iron formed the basis for a paper by H. A. Schwartz, National Malleable Castings Co., Indianapolis. In this paper, which is published elsewhere in this issue, the early history of malleable iron manufacture and the basic metallurgical properties are discussed. These properties serve to show the value of this metal in many lines of engineering endeavor to which malleable is practically unknown. The statement in this paper referring to the establishment in 1903 of the first laboratory in connection with a practical malleable foundry was challenged in a written discussion by Dr. R. R. Moldenke who recounted mixing malleable iron by analysis in 1890. Mr. Schwartz in reply defined his statement as referring to the first practical operating laboratory in daily use in connection with a commercial foundry.

Structural and chemical changes which take place in annealing malleable iron were set forth in a paper by H. E. Diller, General Electric Co., Erie, Pa. Experiments carried on in the research laboratories of the company were explained and the conclusions relative to the time of anneal were outlined. The author drew the conclusion that malleable iron may be annealed in a tunnel furnace in 48 hours or less. A written discussion by Phillip d'H Dressler, American Dressler Tunnel Kilns, Inc., New York, described in detail the type of furnaces referred to by Mr. Diller. In the open discussion following, O. W. Storey, Burgess Laboratories, offered the opinion that packing has no effect on the structure of malleable under the anneal, recounting some experiments using brass packing to prove this point. He stated further that in cooling too rapidly from a temperature of 1600 degrees to 1200 or 1300 degrees Fahr. a hard steely structure resulted; but that the rate of cooling below recalescense had no effect.

"The Integrity of the Casting" was the title of a paper read by Enrique Touceda, New York. Mr. Touceda emphasized the obligation of the malleable iron manufacture which compels the rigid observance of quality considerations as a basis for success in the industry. Sponginess in certain casting sections, it was stated, should never be tolerated. Chills are not necessary, and the proper molding practice with the use of feeding heads renders castings much more satisfactory. Greater attention to patterns was recommended as a cure for unsound castings. In the discussion following this paper

the author stated that the method of making a mixture is not important and that the proportion of the materials in the mix is the factor to be considered. The report of the American Foundrymen's association committee on malleable was presented by Mr. Touceda.

R. S. Archer, bureau of aircraft production, read a most complete paper on annealing malleable iron. This paper was prepared jointly by Mr. Archer and Major A. E. White from experiments conducted at the University of Michigan at the instance of a Detroit automobile company. The experiments were carried on with uniform samples containing 1.05 per cent silicon, and 2.90 per cent carbon and every precaution was observed to preserve the carbon constant. Slides were shown which illustrated the structural changes under different conditions of anneal. The conclusions given stated that speeding up an anneal is disastrous; that the rate of cooling is without metallurgical value; that high temperature annealing aids the machining qualities; and that the best temperatures to be used depend upon the varying conditions in chemical composition of the metal used.

Mining Engineers Hold Steel Session

MEMBERS of the iron and steel section of the American Institute of Mining Engineers decided on Monday morning to defer the program scheduled for that day and to unite with the Institute of Metals division at its interesting Monday session. Accordingly on Tuesday morning the combined program for the two days was presented at a meeting presided over by Prof. J. W. Richards, of Lehigh University, chairman of the iron and steel section. Immediately preceding the meeting motion pictures illustrating in detail the triplex method of making steel were presented. These pictures gave an intimate idea of the operation of the process at the plant of the Illinois Steel Co. at Gary, Ind., which has been fully described in THE IRON TRADE REVIEW. A paper by Henry M. Howe, chairman of the engineering division of the National Research Council was next read. This explained the work of the council in developing the various problems incident to the war. In many cases these problems, first attacked by the council have been taken over and finally worked out by the ordnance or other departments of the army.

Reference to a paper on iron ore resources of the world which was presented but not read, brought forth some interesting observations on what may be considered available resources. Prof. Richards pointed out that only high grade ores appear in the estimates submitted, and that with the development of metallurgical processes vast deposits of unprofitable ores will become of value, and that the limiting factor in the production of iron is really the fuel with which it may be reduced.

Coal in its pulverized form was the topic of a paper read by H. R. Collins, Fuller Engineering Co., Allentown, Pa. Attention was directed to the plant of the Milwaukee electric power company, where a 23-year-old Edgemore boiler has been in operation with pulverized coal for five months at 85 per cent thermal efficiency. Mr. Collins referred to the open-hearth plant of the Atlantic Steel Co., Atlanta, Ga., where temperatures of 3500 degrees Fahr. are obtained. He reported further that a grade of coal selling at $2 per ton burned in a pulverized form in a furnace is more economical than oil at 6½ cents.

A paper on "Carbocoal" read in the absence of its author, C. T. Malcomson, Malcomson Briquet Engineering Co., Chicago, induced the suggestion that experimentation might develop a combination of this form of fuel with pulverized coal in a way which would secure a saving of valuable by-products lost in the gaseous form in burning the pulverized fuel alone. It was stated that in boiler practice the ash from pulverized coal passes out through the stack and that this ash, which is roughly 22 per cent, is so finely divided and is carried to such great distances that it does not form the nuisance incident to heavy smoke. The paper was published in a recent issue of THE IRON TRADE REVIEW.

"Low Temperature Distillation of Illinois and Indiana Coals" was the title of a paper read by G. W. Traer, Universal Coal Products Co., Chicago. It was suggested that the development of a new process of distillation described at length in the paper would produce a fuel of high heat value, low combustion temperature and free from the smoke common to the coal employed. The statement set forth that this would result in a saving in cars involved in bringing anthraciate and Pocahontas coals from the east.

Saving Nonferrous Metals in Wartime

THE sessions of the Institute of Metals division of the American Institute of Mining Engineers opened Tuesday, Oct. 8, at 11:30 a. m., in Kilbourn hall, the Auditorium, Milwaukee. A paper by Zay Jeffries, Aluminum Castings Co., Cleveland, on the metallography of tungsten proved of considerable interest. The discussion showed a divergence of opinion regarding several of the theories advanced to account for the brittleness of tungsten in the ordinary state as contrasted with its ductility when suitably worked —a property different to that possessed by most metals.

A paper on babbitt and babbitted bearings by Jesse L. Jones, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., presented tests of tin-base and lead-base babbitts at progressively increasing temperatures which show that the cheaper lead-base alloys are fully as good and in some respects better for many purposes than the more expensive tin-base babbitts. The discussion that ensued brought out the fact that about 16,000 tons of tin are used annually in the production of babbitts and that as a conservation measure the use of lead-base alloys should be encouraged.

The report of Fred L. Wolf, Ohio Brass Co., Mansfield, O., secretary, showed the membership of the institute on July 1, 1918, was 337, with 49 associate members, making a total membership of 386. The most important development of the past year was the affiliation of the institute with the American Institute of Mining Engineers. The Institute of Metals has not lost its identity through this affiliation and elects its own officers as heretofore. Meetings will continue to be held with the American Foundrymen's association and, in addition, a meeting will be held in February of each year in New York in conjunction with the American Institute of Mining Engineers.

The symposium on the conservation of tin proved the most interesting session for most of the members and was the best attended. It was opened with a paper on "Bronze Bearing Alloys", by G. H. Clamer, Ajax Metal Co., Philadelphia, and was followed by a practical paper by W. H. Waring, Altoona, Pa., in which the steps taken to conserve tin by the Pennsylvania railroad were outlined.

Other papers on conservation of tin were presented by D. M. Buck, American Sheet & Tin Plate Co., Pittsburgh; W. M. Corse, Buffalo, who advocated the increased utilization of aluminum bronzes in place of of tin bronzes, and by Jesse L. Jones.

New Institute Officers

Chairman:
W. M. CORSE,
Buffalo.

Secretary:
FRED L. WOLF,
Ohio Brass Co.,
Mansfield, O.

Vice Presidents:
W. B. PRICE, Scovill Mfg. Co., Waterbury, Conn.; GEORGE K. BURGESS, Bureau of Standards, Washington; HAROLD J. ROAST, James Robertson Co., Ltd., Montreal, Que.; C. H. BIERBAUM, Lumen Bearing Co., Buffalo; SIR ROBERT A. HADFIELD, London, England; W. K. FRANK, Damascus Bronze Co., Pittsburgh; O. H. MATHEWSON, Sheffield Scientific School, New Haven, Conn.; ZAY JEFFRIES, Aluminum Castings Co., Cleveland; W. H. BASSETT, American Brass Co., Waterbury, Conn.

Despite Setbacks Loan Forges Ahead

Largest Subscriptions Come from Iron, Steel and Allied Industries—Peace Talk, Spanish Flu, Forest Fires, etc., Spur to Increased Effort—Doubling Up Movement Starts

TIMED so that it would explode during the fourth Liberty loan campaign, the peace gas bomb from Prince Maximilian, the kaiser's dupe, came over. Unfortunately, in a measure it has had an insidious effect. It has been necessary for the stay-at-home army to don its gas masks and wait for the poisonous air to lift. This air now has been clarified by the President's answer which states how Germany may obtain peace. A number of prospective subscribers wavered, some faltered and a few fell. The few slackers who fell, overcome by the peace gas have caused super-patriots to bear their share of the burden. Therein lies the reason for some subscribers having to double, triple and even quadruple in some cases, their original subscription in order that cities and districts may not fall short of their required quotas.

The kaiser's throne is shaking; he himself is quaking. He has called his henchmen about him to steady him and it for the first time in history. The handwriting on the wall is being read. It spells: "UNCONDITIONAL SURRENDER WITH FULL REPARATION." The peace gas may have delayed some districts in obtaining their quotas but as a means to frustrate the loan it has failed miserably. Subscriptions continue to roll in and the iron, steel and allied industries are fast reaching and exceeding their prescribed amounts. All believe the entire $6,000,000,000 and then some, must be subscribed, since Secretary of the Treasury McAdoo states the money already has been spent.

Kaiser Finds Proper Sphere

Congressman Henry I. Emerson from Ohio made a speech at a recent Liberty loan meeting in which he answered the question: "What are our boys fighting over there?" His reply was: "They are fighting cooties, lice, bedbugs, trench rats and the kaiser." For once the German emperor has been placed in his proper sphere of society. Mr .Emerson might have added the Spanish influenza germ to the list. At any rate, this germ is one of the things with which the civilian army in general and the Liberty loan army in particular have had to contend. If it is true that the hellish distribution of the "flu" germ was designed in Germany to nullify and purposes of the fourth Liberty loan, another disappointment will be added to the kaiser's long list. To contemplate the terrible inroads it has made in various cantonments and districts where the death toll has been so great, ought only to spur on to increased effort.

An army has many vicissitudes. Victory only is attained through difficulties. Because of difficulties encountered, the sweetness of victory is enhanced. This is destined to be the experience of the army of Liberty bond salesmen. Not only is the minimum of $6,000,000,000 to be reached by Oct. 19, it is slated to be exceeded. While it is not expected that the percentage of oversubscription will be as large as in the three previous loans, it will be sufficient to demonstrate to the 2,000,000 boys in France that not only is Uncle Sam back of them, but every son and daughter of America as well. The Spanish "flu" or any other kind of a germ, including the grey-clad ones who are fast fleeing Berlinward, cannot stop the fourth Liberty loan or keep the allied armies from accomplishing their purpose, a victory which will prove that right is might.

No Room for Slackers

Should there be any lagging patriots in this nation of patriots, the IRON TRADE REVIEW makes this eleventh hour appeal: "LET THERE BE NOT A SINGLE SLACKER!" It takes it from a bulletin isued by the Pangborn Corp., Hagerstown, Md., because it believes the thought should have wider circulation. This bulletin, after directing attention to the sacrifices of the boys in the trenches working 12, 16, 18 and sometimes 48 hours at a stretch for $30 a month, calls upon the workmen to make sacrifices in kind and sets forth the company's liberal partial payment plan for loan subscriptions. It also offers a prize of a $50 bond to the department which rolls up the highest total subscription. At the end of the campaign a drawing will be held, the lucky workman being presented with the bond.

Acting entirely on their own initiative, employes of the Atlantic Steel Co., Atlanta, Ga., canvassed the entire organization. The result was that by the morning of Oct. 4, every one of the 861 employes had become a subscriber, the total subscription being $63,300.

By unveiling Liberty motor No. 10,000, Detroit celebrated the close of its campaign one week early, last Saturday. With a quota of $73,000,000, subscriptions were made to total in excess of $80,000,000. Of this total, $12,000,000 was subscribed by the Henry Ford interests; $3,250,000 came from Dodge Bros., and employes; $2,750,000 from the American Car & Foundry Co., and millions more in amounts from $250,000 to $2,000,000 from the other war-work plants in the city.

With a quota of $113,000,000, Cleveland fourd herself at the beginning of the third week of the campaign with approximately $54,000,000 to raise. This inspired workers with renewed enthusiasm and now the middle of the final week finds the city all set for a whirlwind finish. Cleveland, which has sent over 50,000 of her boys to war and which has approximately 300 gold stars in her service flag must not fail to back those boys to the limit. Carl N. Osborn of M. A. Hanna Co., increased his original subscription of $10,000 ten-fold. Price McKinney of the McKinney Steel Co., doubled his subscription of $250,000 and many others are following suit. Some of the larger subscriptions follow: Bourne-Fuller Co., $200,000; Upson Nut Co., $250,000; Hydraulic Pressed Steel Co., $500,000; Standard Parts Co., $600,000; National Malleable Castings Co., $500,000; Motch & Merryweather Machinery Co., $100,000; and the Van Dorn Iron Works with employes $158,000. Employes of the American Steel & Wire Co. subscribed for $1,500,000 worth while employes of the Otis Steel Co., signed up for $750,000.

From Youngstown come wonderful reports of subscriptions by workmen. Individual buying in groups of from 5000 to 12,000 men, averages from $170 to $250. A large percentage of the buyers are aliens and out of $1,600,000 subscribed by 9000 workmen at the Republic Iron & Steel Co., plant, over $200,000 was paid in cash. Much hoarded money is coming into the light in these cash payments. In the day labor department of the Youngstown Sheet & Tube Co., 200 men, 90 per cent alien, averaged $445; 388 construction men averaged $399; 381 open hearth employes averaged $414; 824 steel plant employes, $378 and 1771 tube mill men $217. The first 10,600 buyers at the Youngstown Sheet & Tube plant averaged $247. This total of $2,750,000 included 161 men however, each of whom bought bonds to the amount of $1000 or more. When this tabulation was made, about 2000 men had not filed their subscriptions. At the plant of the Carnegie Steel Co., 6664 men bought $1,135,200 worth of bonds.

Will Germany Have a Victory?

No greater victory could be had on the battle fronts by Germany than the one she will have gained if the fourth Liberty loan falls down. Shall Germany indulge in newspaper headline gloating over the failure of the United States to raise $6,000,000,000 in a fourth loan while she floats her ninth? The yell of approximately 108,000,000 people is a thunderous "NO." Shall President Wilson back water from his determination that no armistice shall give the enemy a breathing spell for recuperation? The answer of 108,000,000 people mingles with that of the 2,000,000 soldiers in France: "No—Germany must pay—with the words, 'we surrender, what do you wish us to do?' Ludendorf must hand over his sword, hilt foremost to Generalissimo Foch. That's the only kind of peace proposal we can consider." In the meantime let the 108,000,000 people dig down deeper and make the closing hours of the campaign glorious for the way they roll up the oversubscription to the victory loan.

To Tie Mills Closer to Ship Yards

General Plan to Advance Sequence of Delivery of Shapes and Plates Will Be Determined at Philadelphia Meeting of Shipbuilders and Steel-Makers —Standardization Methods Expected to be Promoted

WASHINGTON, Oct. 15.—Speeding up in the construction of steel ships through sequential delivery of steel plates and shapes as required, is the object of a meeting to be held in the Bellevue-Stratford at Philadelphia next Thursday when order department heads of the steel mills and shipbuilders will enter a full discussion of questions mutually relating to both industries. This is regarded as one of the most important conferences called upon government initiative. Charles M. Schwab, director general of the Emergency Fleet corporation, is to preside and probably will be assisted by officials of the steel division of the war industries board.

A striking feature of the conference is the fact that the invitations to the mills rolling ship steel specifically stated it is important that heads of the order departments attend. Corresponding officials of the shipyards are to be present also, as will representatives of the fabricating plants. This phase of the proposed conference is significant that important points involving the officials who have been urged to attend, will be taken up and, as in the case of the recent meetings held here of pig iron, plate, shape, rail, pipe, etc., producers, opportunity will be given each to tell his troubles and to answer questions which may be raised by others.

Mills Co-Operate Freely

Invitations sent to the mills by the steel division of the war industries board and to the yards and fabricators by the Fleet corporation are meeting with ready response, indicating all are glad of the opportunity to try to work out some scheme by which the ships may be built and delivered per schedule and by which the mills may be kept in continuous and economical operation. The points have been taken up by government and industry officials at various times and for a specific condition, but never before has it been attempted to work out general plans applying to the entire interrelation of steel mills, shipyards and steel fabricators.

The rapid and enormous growth of the shipbuilding industry, through the construction of new yards and the expansion of old ones, and the resulting unprecedented demands upon the plate and shape mills of the steel industry have brought up problems which, small as each may be, are important factors in the retarding of progress in both trades. With the nation at war and demanding steel for itself and for its allies in tonnages of steel and ships as never before conceived, the authorities feel the time is now ripe when every possible hindering factor is eliminated, or at least reduced to a minimum.

The call to arms, both through volunteering and the draft, has made inroads upon the operating departments of the yards and mills, to say nothing of the same effect brought about by the expansion of both industries, which has resulted in employment of officers and clerks who, from lack of experience, have been unable to cope with many of the daily problems arising in business details common to steelmaking and shipbuilding. As a help to these officials, for whose benefit the invitations were made to include, the meeting at Philadelphia has been called.

Will Advance Standardization

The government has long contended with the problems created through lack of standardization of ships, parts, machinery, etc., in sizes, shapes, quality, etc., and the meeting Thursday is expected to bring this phase into a higher stage of development. It is not expected standardization as such will be discussed, as that question already has been receiving full consideration, but the general consideration of yard and mill problems may throw additional light upon the topic. Attendance at the conference is not to be confined to one or two order department officials of each mill, but to as many as can be present, the more attending the better and more readily the troubles can be aired and remedied.

The recent movement noted in last week's IRON TRADE REVIEW to get immediate delivery to the war manufacturing and the shipbuilding plants of miscellaneous pieces of steel, known as lags, or odds and ends, represents one of the phases of the situation to which the Philadelphia meeting will give attention. Production and delivery at once would also enable the fabrication of completed ships, tanks, trucks, shells, etc., for participation in the war.

To what extent the mills of the country are behind in the production of these odd sizes is not known definitely but it is not believed to constitute a very large tonnage. The need of these sections is, however, very essential to the military, naval and shipping program. While it is recognized a halt in usual mill operations to accommodate the rolling of these pieces would interfere with other essential production, it is confidently believed the immediate manufacture of the lags would put the mills in a better position to meet any future cries of "shortage" which crop up in various parts of the country when a war plant or a shipyard suddenly discovers its work stopped for lack of vital sections.

Mills Near the Peak

The opinion has been expressed here that the steel mills, as far as essential tonnages are concerned, soon are to reach the peak of production, shipping quantities of steel as rapidly as they may be consumed. Already many of the shipyards have piled up thousands of tons of steel, the aggregate, as stated sometime ago, being well above 1,000,000 tons. Shell manufacturing, gun forging shops, tank builders, etc., are said to be receiving deliveries of steel as per requirements. Yet, from various points comes word that small sections, particularly of odd size shapes, are needed and needed badly in order to meet scheduled deliveries of finished products. Shipyards are especially desirous of these materials. The reasons for this will be fully considered Thursday at Philadelphia.

Many of the lags are sizes seldom if ever heard of in mills and, in order to meet other essential deliveries, have been put off until more convenient times for rolling. The accumulation of these odds and ends has been largely due to the designing of innumerable types of ships. In the future this phase is expected to be reduced considerably, if not eliminated entirely, by the standardization of several types of vessels. The shipping board, through the Emergency Fleet corporation, has already been working on this program, for both plates and shapes, with the co-operation of steel manufacturers. Considerable time is expected to be saved by this plan in the production of steel and in the fabrication of ships.

More Industries Are Ordered Curtailed

WASHINGTON Oct. 15.—Discussion of the classification of malleable castings between manufacturers and the priorities division of the war industries board will take place in Washington in the near future. The priorities board has requested data from Frank J. Lanahan, president of the Fort Pitt Malleable Iron Co., Pittsburgh, as chairman of the subcommittee on malleable castings of the American Iron and Steel institute, and as soon as they are assembled the meeting will be called. At present malleable castings are put in class IV under Preference List No. 2. The meeting is to be called upon the initiative of the priorities division to consider the adequacy of this rating and to discuss general priorities matters.

For the purpose of conserving material, labor, capital, fuel and transportation for more essential war purposes, the priorities division has announced further curtailments in different in-

dustries, some of which use large tonnages of iron and steel. The boiler and radiator manufacturers are requested to reduce their consumption of iron and steel to a basis of not exceeding 40 per cent of four-twelfths of the 1917 consumption, and to furnish the products for no uses other than to orders placed by the United States government or the allies or direct agencies of these sources for use in buildings constructed under permits by the war industries board or pursuant to permit of the war industries board, and in repair and replacement of existing heating and radiating equipment.

Other Curtailments Ordered

Other curtailments ordered follow:

Pocket knive industry—Consumption of iron and steel reduced during the last four months of 1918 to a basis not exceeding 70 per cent of four-twelfths of the 1917 consumption.

Bicycle and motorcycle industry—Consumption of materials reduced during the last four months of 1918 to a basis of not exceeding three-fourths or four-twelfths of its 1917 consumption.

Clock-watch and clock industry—To reduce its consumption during the last four months of 1918 of iron, steel, brass and copper to a basis of not exceeding 70 per cent of four-twelfths of its 1917 consumption.

Composition roofing, rag-felt, floor covering and building board industries—Rag-felt, asbestos, building board, building paper, cement, etc., to be confined to needs of United States and the allies and to structures in which material may be allowed by permit of war industries board and to repairs and replacements. Insofar as industry manufactures floor coverings made of bituminous rag felt or felts thereof for and during the period from Oct. 1 to Dec. 31, to reduce its consumption of materials to a basis of not exceeding 40 per cent of three-twelfths of its 1917 consumption and to reserve from general disposition sufficient quantities to take care of government requirements.

To Give Industries Priority

Judge Edwin B. Parker, priorities commissioner, has announced the conditions, upon the fulfillment of which, the priorities division will issue industry priorities certificates authorizing the purchase of quotas of materials and will give preference ratings to manufacturers in these industries:

The gas range, water heater, room heater, hot plates and gas appliances industry.

The metal beds, cots, couches and bunks, and metal springs for beds, cots, couches and bunks industry.

The wire-bound box industry.

The black galvanized and enameled ware and tin plate household utensils industry.

Each of these industries, says a special circular, issued by the priorities division, can supply essential needs if it can obtain limited quantities of materials and if such materials are properly distributed among the manufacturers in the industry with a view of balancing and equalizing stocks. No guaranty will be given the industry that the materials called for in any priorities certificates issued can be supplied. A manufacturer to obtain the certificates must file with the priorities division a statement of stocks on hand, in storage or in transit owned by such manufacturer, his 1917 consumption of materials and output of product, together with quantities of materials needed to balance stocks to manufacture the reduced outputs ordered. The manufacturers must pledge themselves also to observe regulations as to curtailments, economies, and substitutions of materials; to devote products to essential uses and not to furnish products for resale to dealers without obtaining a similar pledge from them.

The curtailments ordered for the last four months of the present year are: Gas ranges, etc., industry to reduce its consumption of iron and steel used in the manufacture of its products to a basis of not exceeding 50 per cent of four-twelfths of its 1917 consumption of such materials for such products. The metal beds, etc., industry is ordered to reduce its production to a basis of not exceeding 50 per cent of four-twelfths of its 1917 output. The black galvanized and enameled ware and tin plate household utensils industry is required to reduce its consumption of iron, steel and tin plate to a basis not exceeding 50 per cent of four-twelfths of its 1917 consumption.

The priorities divisions impressed upon makers of gas ranges, the necessity of their conserving copper, brass and copper products, and to provide substitutes wherever possible because "copper and brass are so urgently and immediately needed for war purposes in quantities beyond the available supply." Makers of metal beds were told that they will be expected to discontinue the manufacture of brass beds or the use of brass or copper in any form, although this does not forbid them from working up stocks they have on hand, unless they are asked to release them for war purposes. Makers of gas ranges, etc., were told it will be exceedingly difficult for their requirements of brass and copper to be supplied and were asked to review their needs with great care and eliminate every use of them which can be eliminated. Brass and copper tubing, in particular, will not be available to the industry for use in the manufacture of water heaters or other commodities.

"Such supplies of brass or copper tubing as you manufacturers may have on hand should be reserved for repairs, and replacements in their products already in use," they were told. "This ruling may result in the shutting down of factories or departments using such materials in which event the war industries board will extend any assistance within its power to aid any such factory or department to procure war work."

Will Clear Up Priorities

WASHINGTON, Oct. 12.—The importance of immediate and correct interpretation of priority regulations and of full and comprehensive understanding of all priority matters by the industries and plants which these rules and points are made to cover has finally been recognized by the priorities division of the war industries board. Plans are now under way for establishment of branch priority offices in each of the 20 regional divisions created by the resources and conversion division of the industries board.

Just as quickly as the priorities division can find men fully versed in the subject, which appears daily to becoming a more intricate one, they will be appointed to the regions so that manufacturers, producers, consumers, dealers and others interested may get ready attention upon points they raise. This will, in a measure, decentralize the priorities control system, making unnecessary many of the trips business men are now forced to make to Washington and relieving the board of the burden of seeing these visitors, and bringing industry and government into personal contact on priorities.

It is not expected, however, that the administration of priorities will be decentralized. This feature of war production appears to require centralized attention and, as the establishment of automatic ratings was designed to help, efforts are made here to give all applications prompt and full consideration. This point need not be made clear to officials as they, above all others, seem to realize the essentiality of speedy manufacture of war materials. The free use of telegrams and long distance phone by the priorities committee indicates that

The priorities committee soon will issue a supplementary document on priorities, the information being more explanatory of past rules and regulations rather than the creating of new control factors.

New Ordnance Assistants

Washington, Oct. 15.—W. W. Coleman, president of the Bucyrus Co., and T. H. Symington, of the Symington-Anderson Co., have been appointed special assistants to Maj. Gen. C. C. Williams, chief of ordnance. The work of following up production of cannon, carriages, mounts, etc., will be under direction of Mr. Coleman, while that pertaining to artillery ammunition, metal components, etc., will be under Mr. Symington's direction. The latter, however, will have nothing to do with loading plant operations. The war department last week asked congress for an additional $1,100,000,000 for its heavy artillery program. This brings the total of the present appropriation under consideration up to $3,767,000,000.

In an interview last week, touching the general military situation, the first assistant and acting secretary of war, Benedict Crowell, said concerning Neville Island: "The work started about three months ago and is in the usual condition of work that old. We will get shells out of there by next summer."

Mr. Crowell said more than 5000 motor trucks were shipped to France last month. During the entire period of the war up to Aug. 31, 213,000 tons of rails and accessories for standard gage and 64,000 tons for narrow gage lines had been shipped to the engineer corps in France.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

ADOLPHUS O. BACKERT, who was elected president of the American Foundrymen's association at its annual meeting in Milwaukee last week, is a native of Cleveland and was educated at Western Reserve university of that city. After engaging in daily newspaper work in Cleveland for several years, he became identified with the business press through the Penton Publishing Co., and has been active in that field for 19 years. For six years he was located at Pittsburgh as representative of THE IRON TRADE REVIEW and *The Foundry*. Subsequently he served for two years as western editor of the *Iron Age*. He became editor of *The Foundry* in 1907 and has served in that capacity ever since, and in connection, for several years, acted as engineering editor of THE IRON TRADE REVIEW. At the present time in addition to being editor of *The Foundry*, Mr. Backert is vice president and general manager of the Penton Publishing Co. He has been very active in foundry organization work. Through his Pittsburgh residence, he was prominently identified with the Pittsburgh Foundrymen's association. He became secretary of the American Foundrymen's association in 1914 and has served continuously until the present time. Mr. Backert organized and became secretary and treasurer of the Foundry Supply Manufacturers' association. At the present time he is secretary and treasurer of the Molding Machine Manufacturers' association and is secretary of the Foundry Equipment Manufacturers' association which has just been organized for the period of the war. He has contributed many papers to the American Foundrymen's association particularly on molding machine practice and cost work. It was largely from his investigations and studies that the standard cost system for foundries now being widely adopted, was initiated. Mr. Backert succeeds Benjamin D. Fuller as president of the American Foundrymen's association.

I. J. Shults has been placed in charge of the Cleveland sales office of the United Alloy Steel Corp., Canton, O., which is located at 614 Swetland building. Mr. Shultz previously represented the company at Syracuse, N. Y. Chester R. Williams has been promoted to have charge of the corporation's Chicago office.

John J. Muir has resigned as superintendent of the engineering department of the Bass Foundry & Machine Co., Fort Wayne, Ind., to become general superintendent of one of the largest shipbuilding concerns on the Pacific coast, located at Seattle. Mr. Muir has been affiliated with the Bass company for about 18 years.

Port of Seattle commission will receive bids up to Oct. 23 at 2 p. m. at its office, Bell Street dock, for the furnishing and installation of a steam locomotive crane in what is known as the Smith's cove improvement of the port of Seattle. Plans are on file at the office of the port commission. Bidders are invited to submit alternative bids upon designs of their own.

C. W. Peffer, former superintendent of the open hearth department of the Republic Iron & Steel Co., Youngstown, who lately resigned to accept the general managership of the Donner Steel Co., Buffalo, was recently presented $850 in fourth Liberty loan bonds and a solid gold watch, chain and charm by department operatives as an expression of regard.

ADOLPHUS O. BACKERT

J. T. Jack, employment manager of the Niles Tool Works, R. H. Nurke, of the Hoovens, Owen, Rentscheler Co., W. E. Moons of the Mosler Safe Co., and Mr. Shear, employment manager of the Hamilton Foundry & Machine Tool Co., all of Hamilton, O., recently attended a meeting of employment managers in that city where apprenticeship conditions were discussed.

J. H. Barringer has been elected vice president and assistant manager of the National Cash Register Co., Dayton, O., which has a number of government contracts, including one for a large quantity of pistols. Mr. Barringer has been affiliated with the company for 11 years and has advanced to his present responsible position through successive promotions. He has been assistant manager since July last, but now succeeds Robert Patterson, who recently resigned as vice president.

W. W. McMillan and Frank R. Anderson of the Sharon, Pa., plant of the National Malleable Castings Co., have been transferred to the main office of the company at Cleveland. Mr. McMillan is purchasing agent of the company and Mr. Anderson is his assistant. They were tendered a farewell reception recently by their fellow employes at Sharon and each was presented a traveling bag.

Ralph W. Clark has been granted a leave of absence from the New York office of Rogers, Brown & Co., to become manager of the recently-created raw materials section of the production division of the ordnance department at Bridgeport, Conn. He will have charge of obtaining pig iron, steel and other raw materials in that district, which comprises Connecticut and western Massachusetts.

Alfred K. Potter, president and treasurer of the E. A. Potter Co., Providence, R. I., has been elected treasurer and a director of the Gorham Mfg. Co., of that city, succeeding in the former capacity, Edward Holbrook, who has been treasurer for 31 years and who will remain as president. He probably will relinquish his present connection with the E. A. Potter Co. at the end of the year.

John Lyons Collyer, superintendent of the service department at the Harlan-Bethlehem plant at Wilmington, has been appointed general supervisor of the same department in all the Bethlehem plants scattered over the country. Mr. Collyer won fame with the oars in a Cornell crew, and after leaving there with his degree went straight to the Sparrows' Point plant, now owned by Charles M. Schwab, and took a job at 40 cents an hour.

A. G. Lapierre, assistant in the Northwestern regional director's office of the United States railway administration, has been appointed traffic manager for the Chicago Pneumatic Tool Co., with headquarters in Chicago, succeeding E. H. Greene. T. O. Southbrook, in charge of efficiency work of Joseph T. Ryerson & Son, has been appointed manager of the order and production department of the same company.

Thomas MacDonald, consulting engineer, Youngstown district, Carnegie Steel Co., has been named chairman of the Youngstown council of national defense committee to supervise new construction under the ruling that no new projects may be undertaken, involving an outlay of more than $2500 without federal permission. C. H. Kennedy, banker, and H. D. Rhodehouse, chamber of commerce traffic manager, are the other members.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

THOMAS A. ARTHUR, resident manager of the Pittsburgh office of Hickman, Williams & Co., Inc., has been elected vice president to fill the vacancy created by the election of T. Coleman Ward to the presidency of the company. Mr. Arthur, who will remain in Pittsburgh and retain his managerial duties, has been with the company since 1907 and has been resident manager since early in 1915. He was born in Lancaster, Pa., in 1876, but early located in Pittsburgh. He was graduated from the Allegheny high school and his first position was with the Standard Mfg. Co., with which company he was affiliated about six years. He joined the Pittsburgh office staff of Naylor & Co., in 1897, and continued with Banning, Cooper & Co. after 1899 after the latter succeeded to the western interests of Naylor & Co. In 1907 he became identified with Hickman, Williams & Co.

G. L. Hanson has been made general manager of the Advance Machinery Co., Van Wert, O., manufacturers of machine tools, etc.

O. W. Mason, eastern manager of Hickman Williams & Co., Morris building, Philadelphia, is about to leave for France on Y. M. C. A. work.

Hiram Johnson, master mechanic of the Turner & Seymour Mfg. Co., Torrington, Conn., has resigned to accept a similar position with the Stamford Rolling Mills Co., Stamford, Conn.

Edward M. Stanley, superintendent of welfare work at the Bristol Brass Co., Bristol, Conn., has resigned to go to Bath, Me., where he will be engaged in construction work.

Jerome R. George, chief engineer of the Morgan Construction Co., Worcester, Mass., has been appointed director of wood fuel for Massachusetts.

Henry F. Ludorf of the Ludorf Engineering & Construction Co., New Britain, Conn., has entered Columbia university, New York, to train for a commission in the United States army.

W. C. Minier has been placed in charge of the recently-opened office in Cleveland of the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y. This office is located in the Union National Bank building.

John G. Jones who has been with the Western Reserve plant of the Brier Hill Steel Co., has assumed his new duties as superintendent of labor and construction at the Sharon Steel Hoop Co. plant in Youngstown.

Paul W. Cotton, former district sales manager of the Republic Iron & Steel Co. at St. Louis, has been made sales manager of the Pacific Coast Steel Co., with headquarters in Seattle.

Robert Mawson who until recently was affiliated with the Quigley Furnace Co., New York, now is general superintendent and production manager of the ordnance department of the Mosler Safe Co., Hamilton, O.

J. E. Grady resigned recently as sales manager of the Studebaker Corp. of Canada, Ltd., to become affiliated with the Cleveland Tractor Co., Cleveland, in an important capacity in the vice president and general manager's office.

H. S. Ketcham has resigned as New England district sales manager for the Cleveland Tractor Co., Cleveland, to become sales manager of the southeastern and southwestern districts for the Health Duplex division of the McCord Mfg. Co., Inc., Detroit.

C. A. Ilgenfritz has been appointed purchasing agent of the Brier Hill Steel Co., Youngstown, O., succeeding W. C. Monn, resigned to accept a position in the United States ordnance department. Mr. Ilgenfritz has been assistant purchasing agent for some time and with the corporation since its organization.

Lieut. James G. Nixon, who before his enlistment was salesman for the Manning, Maxwell & Moore Co., Cleveland, dealers in cranes, machine tools, etc., was named in Sunday's casualty list as being severely wounded in France. He has been abroad for about two months.

H. M. Thomas, formerly connected with the Hubbard Steel Foundry Co., East Chicago, Ind., and for the past six years superintendent of the rolling department of that company, has joined the organization of the Mesta Machine Co., Pittsburgh, as engineer of the roll and mill department.

Frank H. Brown, one of the founders of the Brown & Zortman Machinery Co., Pittsburgh, more recently affiliated with the Davis Machine Tool Co., Rochester, has become sales manager of Sherritt & Stoer Co., Inc., Philadelphia, machine tools, railway and machine shop equipment.

Albert E. Briggs, formerly connected with manufacturing plants and machine shops in Rhinelander, Wis., has opened a plant of his own. It is equipped with a lathe, screw cutting machine, drill press, welding apparatus and other requisites for general machine repairs.

W. W. Coleman, president of the Bucyrus Co., South Milwaukee, and T. H. Symington, president of the T. H. Symington Co., Rochester, N. Y., have been appointed special representatives to assist the chief of ordnance, with headquarters in Washington.

A. W. Dietzel, plant superintendent of the Waukesha Motor Co., for several years, has retired to accept the position of works manager of the I. B. Rowell Mfg. Co., Waukesha, Wis., maker of automotive accessories and supplies, farm tillage tools ad agricultural specialties.

O. T. Webb, dealer in new and used machine tools, formerly located at 25 Mack block, Milwaukee, and W. T. Reimer, formerly a member of the sales department of the M. J. Walsh Machinery Co., 141 Sycamore street, Milwaukee, have opened salesrooms, office and display rooms at 224 Fourth street, that city.

Willard E. Freeland, for the past three years New England editorial representative of *Iron Age*, New York, resigned to become assistant to John E. Otterson, general manager of the Winchester Repeating Arms Co., New Haven, Conn. He will begin his new duties Nov. 1, removing his family from Holden, Mass., to New Haven.

Walter Goodenough has resigned as vice president of the American International Shipbuilding Corp. in charge of ship construction at Hog Island and will return to the Boston headquarters of the Stone & Webster Engineering Corp. William W. Locke now is in charge of ship construction at Hog Island.

George D. McDougall, chief engineer of the Dominion Iron & Steel Co., Sydney, N. S., a brother of D. H. McDougall, the new president of the Nova Scotia Steel Co., New Glasgow, N. S., has resigned, effective at once. Mr. McDougall has accepted the position of general superintendent of the Nova Scotia Steel Co.

William A. Lydon, president of the Great Lakes Dredge & Dock Co., and well known as a sportsman, is seriously ill at his home in Chicago. When the United States entered the war Mr. Lydon turned over his steam yacht, the LYDONIA, to the government. Within the past fortnight he received word the craft had sunk a submarine in the Mediterranean.

C. F. Knowlton, for many years assistant superintendent of foundries of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and who has been located at the Cleveland foundry for about eight years, has been appointed superintendent of the Westinghouse foundries to succeed Benjamin D. Fuller, who recently resigned.

W. H. Winslow, of Winslow Bros., Chicago, munition manufacturers, has received word that his son, Lieut. Alan F. Winslow, an aviator who had been reported missing and also as having been killed in action, is a prisoner in Germany. The news of his being in the hands of the Germans also states that his left arm has been amputated, as a result of wounds. First report of his injury came late in July and this is the first definite information the family has had.

Employers Linked With Draft Heads

Employment Service Division of Department of Labor Names Representative to Aid Employers Co-operate With Selective Service Officials in Insuring "Furloughs" for Essential Men

TO enable employers to co-operate with Provost Marshal General E. H. Crowder in insuring deferred classification for men necessary in essential industries the employment service division of the department of labor has named a representative to act with the central authorities in Washington in the administration of the selective service law.

In a circular letter to all employers the employment division states that the industrial adviser will be the agency through which the needs for skilled labor and the supply of skilled labor in each community and throughout the country will be communicated to the district board. He will advise employers as to their right to file claims for deferred classification for registrants by whom or in whose behalf no claims have been made. A synopsis of the law which explains the methods for claiming deferment or "industrial furlough", as it is termed, also is being sent to employers. After announcing the appointment of the adviser at the instance of the district board, the letter proceeds:

"It is the duty of all employers who are engaged in industries deemed necessary within the meaning of the selective service regulations to present to the district board a claim for deferred classification for any man who is necessary by reason of being especially fitted for the work in which he is engaged, or by reason of being a highly specialized expert or manager. You should not fear to be accused of partiality. It is a patriotic duty to make distinction among your employes, to claim deferred classification for such necessary men and not to make claim for men who are not necessary. The employer who fails to make a claim that should be made is as blameworthy as the employer who, to avoid inconvenience to himself, claims deferred classification for a man who is not necessary.

"You should keep the industrial adviser informed of the needs for labor in your industry and particularly of men of skilled trades which to your knowledge are becoming depleted. This information disseminated through the medium of the United States employment service will aid not merely your community but the whole country.

"The country is faced with the necessity of raising one of the largest armies ever raised by any nation in all history, and at the same time with the equally imperative necessity of preserving industry at home to supply that army with a greater amount of equipment, arms, ammunition and supplies of every sort, including means of transportation, than was ever conceived by the mind of man.

"The army cannot be given the supplies and support which it needs if industry is stripped of the labor on which it depends for its efficient functioning. An army cannot be raised if all industrial workers are given deferred classification. All local and personal considerations must be subordinated to the national need, and the national aim must be kept in the foreground and supported to fulfillment."

This, in substance, is similar to the recent letter to employers written by General Crowder and serves to emphasize the importance the government is attaching to keeping essential men at work at home. It goes a step further in providing a means for the employer to keep the draft officials in touch with industrial conditions.

Plan Conscription for All Essential Workers

Washington, Oct. 15.—Plans for supplying labor to essential war industries along the lines of conscription are being worked out by the labor administration, according to Chairman Baruch, of the war industries board. Details of the plan have not been disclosed officially but several possibilities have been made known, the main point being that war plants will drain others of all available and competent labor. While the word "draft" will not be employed in reference to the plan, the effect will really amount to that, it is stated. In lieu of necessary laws, "patriotic appeals" will be made to "tap the lesser essential industries for the essential industries for labor supply."

Mr. Baruch pointed out that the shipping board wants 190,000 workmen, that the ordnance department is short 120,000, that the shortage is growing and that all are needed in essential government work. To get men for this work the plan will provide for their transfer from nonessential duties in their own communities, this is effort to keep their homes intact and to incure no discomforts or inconveniences.

8-Hour Day Granted in New Labor Decisions

The war labor board has handed down additional decisions upholding the basic 8-hour day, the essential features being the same as those in the Wheeling case. The new decisions apply to the American Locomotive Co., Schenectady, N. Y., the Mason Machinery Co., Taunton, Mass., and the United Engineering & Foundry Co., Youngstown, O. In the case of the American Locomotive Co., the award of time and one-half for overtime and double pay for work on Sundays and holidays is retroactive to May 1, 1918. In the matter of higher wages for employes of the Mason Machine Co., the board directed the company and employes to settle their differences through their own representatives.

The decision relating to the United Engineering & Foundry Co., does not change the present status of the employes as the company put in effect the 8-hour day rule and extra pay feature Oct. 1. The decision is expected to influence other operatives in the Youngstown district to demand similar concessions.

Official announcement has been made by the Pittsburgh Steel Co. that it has adopted the basic 8-hour day for its workmen effective Oct. 1. Details of the new arrangement are being worked out. The Jones & Laughlin Steel Co. took similar action several days ago and other independents probably will fall in line, although official announcements have not yet been made. It is understood the Cambria Steel Co. has published a notice to its workmen initiating the 8-hour basic day on Nov. 1 for day and tonnage labor.

The Bethlehem Steel Co. has adopted the 8-hour basic day effective Oct. 1, applicable to all except its salaried employes. Under the terms of the announcement, the men will be paid time and one-half time for all work over eight hours.

Coke Oven Accidents Grow

That greater hazard exists in the operation of by-product coke ovens than beehive coke ovens is indicated in the third report published by the bureau of mines. This gives a compilation of coke oven accidents in the United States during the calendar year 1917. These data develop the fact that while the number of employes has increased, the fatality rate has increased in greater ratio. The number of men killed among 32,417 in 1917 was 76, as compared with 45 among 31,603 in 1916. Based on the number of 300-day workers, the fatality rate in 1917 was 2.14 per 1000 as against 1.32 the previous year. The injury rate in 1917 was 188.59 per 1000 men employed as compared with 153.49 in 1916. Statistics were collected from 69,637 beehive ovens and 7276 by-product ovens. In 1917, the average number of days active, was 329; in 1916, the number was 324.

The John A. Roebling's Sons Co., Trenton, N. J., and Roebling, N. J., has granted another increase in wages to its several thousand employes. The men will now work on an 8-hour schedule and receive time and one-half for over time, thus doing away with the bonus system. The increase went into effect October 1.

Obituaries

EDWARD BAILEY COOK, assistant manager of the blast furnace department of Pickands, Mather & Co., Cleveland, died Oct. 13, at his home in Cleveland following an attack of influenza, which developed into pneumonia. Mr. Cook had been identified with the Pickands, Mather interests since November, 1912. Previously he had been connected with the Warwick Iron & Steel Co., Pottstown, Pa., where he had obtained a very extensive blast furnace experience in association with his father the late Edgar S. Cook, who organized and became president and general manager of the Warwick company, in 1899. Mr. Cook was 39 years old, having been born in Pottstown, in 1879. He was graduated from the Massachusetts Institute of Technology and his first position was that of firing the boilers for the Warwick company. Through various promotions he rose until he was general manager of the Warwick blast furnaces when he resigned to become affiliated with Pickands, Mather & Co. He leaves a widow and four children, his mother and two brothers. One of the latter is a lieutenant in Great Britain's aviation service and the other is a captain in the medical reserve corps which was sent on a diplomatic mission to Armenia and Persia.

Mr. Cook was one of the well known and most highly regarded blast furnace men among the younger school of blast furnace operators in the country. He was a man of very progressive ideas and through the exercise of this trait largely made the Warwick furnace blast one of the most productive and best equipped merchant properties in the east. He was a member of the American Iron and Steel institute and of various clubs at Cleveland, Toledo, Erie and Canton, O. Internment was made at Pottstown, where his mother resides

Harry H. Latham, president of the Latham Machinery Co., Chicago, civil engineer and inventor of labor saving devices, died Oct. 10 from influenza after an illness of one day.

William P. Tuechter, president of the Century Machine Co., Cincinnati, died after a short illness, Oct. 13. He was a native of Cincinnati and was 42 years old.

Sergeant James A. Kilda, formerly in the Philadelphia office of Hickman Williams & Co., died of pneumonia at Camp Meade, Md., Oct. 5. Previously Mr. Kilda had been connected with the Pennsylvania Steel Co. and the Bethlehem Steel Co. He enlisted last January.

Sir Ratan Tata, son of the late Jamsetjee N. Tata, who founded the Tata Iron & Steel Co., Sakchi, India, died in England at St. Ives, Cornwall, early last month at the age of 47. His health has been failing for the past four years. He with his brother Sir Dorab Tata have completed many of the projects started by their father and have carried on the iron works at Sakchi and hydro electric power station at Bombay.

Sherman C. Schauer, vice president and general manager of the Cincinnati Bickford Tool Co., Cincinnati, died at his residence in that city Oct. 11, aged 53 years. He had been connected with the Cincinnati Bickford Tool Co. ever since its organization, and previous to that time was with the Cincinnati Machine Tool Co.

Horace Wilson, formerly chief clerk for seven years of the American Iron and Steel institute, 61 Broadway, New

EDWARD B. COOK

York, died of pneumonia at Elizabeth, N. J., Oct. 8, aged 34 years. Mr. Wilson's home was in South Amboy, N. J., where he was confined with Spanish influenza at the time of the Morgan explosion. Exposure attendant upon his being moved to Elizabeth to escape the explosion, brought on his death. Since May 1, when he resigned his institute duties, Mr. Wilson has been assistant superintendent of the Du Pont Powder Works, near Morgan, N. J.

Frank A. Lowery, assistant to Capt. D. E. Sawyer, chief of the section of the war industries board, dealing with projectile steel, rails and alloy steel, died at his home in Bethlehem, Pa., Oct. 8, following an influenza illness of only a few days. Mr. Lowery was secretary to I. W. Gillespie, assistant general sales agent of the Bethlehem Steel Co., before going to Washington to join the staff of J. Leonard Replogle, steel director for the war industries board. Mr. Lowery, who was 32, was one of the most popular young men under Mr. Replogle. He came to Washington as assistant to Paul Mackall, of the Bethlehem company, who was succeeded by Captain Sawyer when Mr. Mackall went to Europe as the war industries board's steel representative in the interallied munitions council.

Millard Hunsicker, one of the partners of Andrew Carnegie, died Oct. 10 at Harrowgate, Yorkshire, England. Mr. Hunsicker began his career in the iron and steel industry in a testing laboratory at Pittsburgh and it was as an inspector that he first came into the notice of the original Carnegie organization. Later, he joined Carnegie, Phipps & Co., as engineer of tests and later became connected with the Carnegie company's armor department. In 1892 he went to London to assume the management of the Carnegie interests there. Mr. Hunsicker became London representative of the United States Steel Products Co. at the time of its organization and continued in this capacity until his resignation in 1906. He was a large stockholder in the United States Steel Corp. Since the outbreak of the war he had been active in Belgian relief work and was vice chairman of the American Belgian relief commission.

Lieut. Philip J. Davidson, who recently was killed in action at the front in France, was treasurer of the Union Drawn Steel Co., Beaver Falls, Pa., and identified with many other industrial enterprises. He was born May 26, 1891. He was a graduate of Beaver public schools, Lawrenceville Preparatory school and the University of Pennsylvania. After leaving college, he traveled extensively in this country and abroad. He entered the mills of the Union Drawn Steel Co., spending about one year in the various manufacturing departments. He then entered the company's office and later was made treasurer. In the early days of the war, he endeavored to enlist in the English army, but was not successful. When the United States declared war on Germany, Mr. Davidson endeavored to enlist in the various branches of service. He did not succeed until the fall of 1917. On Sept. 9, 1917, he entered the second officers' training school at Fort Oglethorpe, Georgia, receiving a commission as first lieutenant of infantry in November. On May 5, 1918, he sailed for France and went into immediate action, being killed while rushing a machine gun nest, having served just four days and four nights. At the time of his death, in addition to his Union Drawn Steel connection, Mr. Davidson was also secretary and treasurer of the Ideal Tool & Mfg. Co., Beaver Falls, Pa. He was director of the Union Drawn Steel Co., Ltd., Hamilton, Ont., the Davidson Ore Mining Co., Buffalo, Union Coal & Clay Co., New Galilee, Pa.; Knott & Harker Co., and the Farmers' National bank, Beaver Falls, and the Beaver Trust Co., Beaver, Pa. He likewise was partner of the Frank M. Hoover Co., Pittsburgh.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Peace Talk Depresses the Steel Shares

STEEL stocks were pounded heavily in the stock market early last week, when prospects of early peace appeared more definitely in view than at any time since the war began. This pressure against the steel and allied issues was based on the theory that earnings of steel companies would be greatly curtailed by the end of the fighting. Sentiment in this direction, however, was affected much by Judge Gary's optimistic statement as to the after-war effects on the industry, and while liquidation continued to some extent, prices gradually stiffened. Declines in the prices of steel company common stocks from the time of Bulgaria's surrender to the close of last week ranged from about five points in the cases of United States Steel, Republic Iron & Steel, and Midvale, to about eight points in the case of Lackawanna Steel and 10 points in Crucible and Bethlehem B. Traders in the stock market have analyzed the general position of the steel stocks after the war, contrasting favorable and unfavorable conditions. Judging from the action of the market, the balance has been on the unfavorable side of the scales. Following are the principal unfavorable factors as seen by one authority:

1. Loss of war business.
2. Probable decline of prices.
3. Effect upon labor situation.

And here are the factors on the favorable side:

1. Demand for steel for reconstruction work in Europe and for pent-up work in this country.
2. Reduced taxation, or at least removal of probability of further increases.
3. Larger supply of labor and improved transportation facilities.
4. Large quick assets in the form of cash, Liberty bonds and other quick assets, also, in many cases, radical reduction of bonded indebtedness.
5. Many new plants and equipment, the cost of which has in many cases been largely written out of profits made in the war period.

Further evidence was noticeable the past week that the Liberty loan campaign was dragging to the extent of threatening its success. President Wilson's appeal stimulated enthusiasm to some extent, but there were widespread fears that there might be relaxation of effort just as victory is in sight, a relaxation that might endanger that very victory. The uncertainty of taxes for the current year and the readjustment of business due to the draft extension to wider age limits have been primary reasons for the lagging. But, with victory itself the big stakes, the future must be left to take care of itself. The bonds must be subscribed for.

Algoma Steel Assets Are Over $11,000,000

That they should not be blinded by present-day prosperity was the warning note sounded in his annual message to stockholders of the Lake Superior Corp., by F. Frater Taylor, chairman of the board and president of the Algoma Steel Co., the corporation's strongest subsidiary. The present prosperity is largely the result of the war, Mr. Taylor declared, and the time will come when munitions orders will cease. "It is difficult to predict the future," he continued, "but one thing is certain, we can do our best to provide against that future by securing ourselves through entrenchments in as strong a cash position as possible."

In his review of the corporation's position and operations, Chairman Taylor said in part:

"We come now to the most important of our operations, namely, those conducted by the Algoma Steel Co. As will have been seen from the annual report, the output, as expressed in steel ingots, was virtually 500,000 tons, about 100,000 tons short of what is believed to be the capacity of the steelmaking plants. Since mailing the annual report we are able to announce progress. For the two months ending Aug. 31 last 94,564 tons ingots were produced as against 73,985 tons for the same period of the previous year.

"In the balance sheet 'products on hand' only amounted to $191,091, which is indicative of the fact that everything is practically shipped out as soon as it is manufactured. The item calling for special comment is, of course 'materials and supplies', which at June 30 amounted to $6,208,439. This figure is an increasing one up to the close of navigation, from which time the values of inventories become reduced.

"At June 30 there were roughly 300,000 tons of ore on hand at a value of over $1,300,000. Pig iron accounted for over $250,000, scrap and partly finished products for roughly $500,000. Whilst miscellaneous materials, including coal and coke, of which there was a stock valued at nearly $1,500,000, amounted to $3,738,000.

"Attention was called in the annual report to the fact that as far as practicable Algoma Steel Co. was endeavoring to make itself more self-contained. This winter, for instance, it will be able to make its own ferrospiegel and much of its own brick requirements.

"The liquid position generally is strong. As the balance sheet shows, current assets amounted to over $11,000,000, whilst current liabilities were slightly in excess of $3,000,000.

"With reference to new construction generally, needless to say, a steel plant, if it is at all progressive, must keep up to date—able to cope with trade demands, but all the time your directors have endeavored, and are endeavoring to limit expenditure to essentials only. The present program of new construction on hand entails expenditure of roughly $800,000."

Lackawanna Net Earnings Show a Reduction

Several factors contributed to reduce the net earnings of the Lackawanna Steel Co., Buffalo, whose third quarter report has just been published. These include increased taxes, effects of the war, higher labor and material costs, etc. The company's net earnings fell off considerably, both as compared with the second quarter of the year and with the third quarter of 1917. The report for the nine months' operations, shows profits of a little more than one-half those earned in the same period a year ago.

Since the gross earnings for the third quarter are only about $1,000,000 less than last year's it is believed that the fact that the net was $1,932,086 as compared with $4,247,147 for the corresponding quarter in 1917 is due to the big tax reserve, which is $3,750,000 for the quarter.

The same holds true with the nine months' report which shows gross earnings of $20,744,402 as compared with $22,826,955 last year, while net profits after taxes were $6,991,376 as against $12,749,219. For the nine months the tax reserve is $11,250,000 as compared with only $7,267,972 in the same period of 1917.

The company earned a balance of $19.91 a share, after charges and war taxes in the nine months of the year as against $36.32 for the same period in 1917. The third quarter's balance was equivalent to $5.50 a share as compared with $12.10 a share last

year. The comparative income accounts for the third quarter and for the nine months' period follow:

FIRST NINE MONTHS

	1918	1917
Total net earnings	$20,744,402	$22,826,996
Deduct:		
Interest on Bonds, etc.:		
Lackawanna St. Co.	699,469	933,867
Subsidiaries	130,682	145,604
Rents, royalties		8,543
	830,151	1,088,014
Balance	$19,914,251	21,738,982
Less appropriations:		
Extinguishment mines and mining invest.	327,191	340,521
Depreciation, etc.	1,345,678	1,381,450
	$ 1,672,875	$ 1,721,971
Profit before taxes	$18,241,376	$20,017,011
Tax reserve and special contingencies	11,250,000	*7,267,792
Profit nine months	6,991,376	12,749,219

*This is the actual proportion for the nine months of the total taxes reported and paid for 1917 and will differ from the figures originally reported because of those being on an estimated basis only.

THIRD QUARTER

	1918	1917
Total net earnings	$6,561,518	$7,021,871
Balance after interest and rental deductions	6,285,341	6,665,015
Gross profit	5,682,086	6,096,317

Unfilled tonnage at the end of the third quarter, 1918, was 451,405, while at the end of September, 1917, it stood at 791,962. At the end of June, 1918, this figure was 556,207, as against 913,196 the year before. In the company's annual report, unfilled tonnage as of Dec. 31, 1917, was 731,526, as compared with 811,126 on Dec. 31, 1916.

Foreign Holdings Increase

Foreign holdings of United States Steel common increased during the quarter ending Sept. 30, despite the fact that English holdings of these shares were reduced. Holdings of the preferred in England also declined. French holdings of the common stock increased, also German and Austrian, the last two named owing probably to discoveries of enemy-owned stock by the alien property custodian. At the end of the September quarter 495,009 shares of Steel common were owned abroad, an increase of 3545 shares in the three months. The amount of preferred credited to foreign owners was 147,845 shares, a decline of 1781 shares. The drop in the preferred was due in part to a contraction of British holdings, which amounted to 528 shares. Canadian purchases increased the total of common stock held by nearly 4000 shares, but a decline occurred in the preferred ownership in Canada.

Tool Steel Plant Resold

Since after his purchase on Sept. 5 of the Cayuga Tool Steel Co., Auburn, N. Y., for $165,050, Robert A. Uihlein of Milwaukee, discovered he would encounter difficulty in obtaining electric current for the plant, he decided not to keep it. It was resold to Arthur E. Hopkins and others at Syracuse on Oct. 1, for $170,050. The $150,000 addition which Mr. Uihlein planned to build to the plant to manufacture electric steel would require 2500 kilowatts of electric current per day and the government has curtailed the amount of current that can be distributed east by the Niagara Power Co. Mr. Uihlein and his associates are building a large carbo-electric plant at Niagara Falls.

Cannot Sell for Taxes

County treasurers are restrained from selling coal lands of J. V. Thompson for taxes in an order issued by Judge Charles P. Orr, in Pittsburgh, continuing the restraining order previously issued, which expired Oct. 1. The trustees in bankruptcy, through their attorneys, informed the court that within 60 days they would be able to pay all taxes from sales of coal land already made. A permanent injunction preventing such sale is understood to be in effect in West Virginia.

Take Over Sligo

Pittsburgh, Oct. 15.—New interests identified with the Commercial Iron & Steel Corp. and the Federal Export Corp., New York, have secured absolute control of the Sligo Iron & Steel Co., of Connellsville, Pa. This was announced following a meeting held here last week, at which the old officers resigned and S. C. Munoz, head of the New York companies, was elected president of the Sligo company. Dwight S. Guthrie, formerly connected with the Republic Iron & Steel Co., was chosen vice president in charge of operations; W. W. Darley, formerly with the Babcock & Wilcox Co., vice president and secretary in charge of sales, and Fred L. Watson, at one time treasurer of the American Steel & Wire Co., was elected treasurer. These officers with Sam A. Benner, Harry Raymond and George M. Pynchon comprise the board of directors.

Plow Profits on Increase

As a result of improvements in its busines during the year ended June 30, the net profits of the Cockshutt Plow Co., Brantford, Ont., materially increased. An outstanding feature of the annual report is that a larger share of the company's business was done on a cash basis than ever before. The company earned net profits after providing for depreciation of $553,215 as compared with $370,745 in 1917 and $465,211 in 1916.

Financial Crop Ends

Since the beginning of the war the ordnance department has placed contracts totaling $4,300,000,000.

* * *

The Atlantic Foundry Co., Cleveland and the Fulton Foundry & Machine Co., of that city have consolidated. Real estate held by the former has been formally transferred to the latter.

* * *

The Killen-Strait Mfg. Co., Appleton, Wis., maker of farm tractors and engines, has been placed in charge of C. L. Marston as receiver on order of the circuit court. Arrangements are being made to sell the plant at public auction in order to effect a reorganization.

Find Substitute

For Solvent Naphtha Which Will Help Market—Ammonia Output Grows

New York, Oct. 12.—Producers have been making considerable progress in discovering a satisfactory substitute for solvent naphtha. The indications are that such a substitute will be on the market within the next couple of weeks. No solvent naphtha now can be bought in the open market since all of this product is going to the navy department.

Output of sulphate of ammonia continues to increase due to new by-product coke capacity. While the government's requirements are swelling right along, producers continue able to supply commercial users. Fertilizer manufacturers are buying sulphate at $4.50 to $4.75 per 100 pounds, tidewater.

The explosion at the T. A. Gillespie Co.'s shell-loading plant at Morgan, N. J., is not expected to have very much effect upon supplies of toluol. Not only is this plant to be rebuilt immediately, but work at other shell-loading plants will be pushed to make up for the temporary loss in production.

While the benzol market cannot be considered as active, a number of good sized sales were made during the past week on the basis of 22 to 27 cents per gallon. Despite recent indications which were regarded as definite that the war trade board would grant licenses for exporting phenol made prior to Aug. 21, such licenses have not yet been formally granted. Therefore, while numerous lots of such material have changed hands at premiums of about 2 cents per pound, they cannot yet be moved from seaboard. The market on phenol continues to be quoted at 42 to 44 cents per pound.

Coke Oven By-Products

	Spot
Per Gallon at Producers Plant	
Pure benzol	$0.22 to .27
Toluol (on sales sanctioned by government) (tank cars)	1.50
Toluol (on sales sanctioned by government) (drums)	1.55
Toluol (for government)	1.50
Solvent naphtha	no market
Per Pound at Producers Plant	
Phenol	$0.42 to .45
Naphthalin (nominal)	.12½ to .13
Per 100 Pounds at Seaboard	
Sulphate of ammonia (to fertilizer trade)	$4.50 to 4.75
Contract	
Pure benzol	nominal
Toluol	no market
Solvent naphtha	nominal
Per Pound at Producers Plant	
Phenol	nominal
Per 100 Pounds at Seaboard	
Sulphate of ammonia (for commercial use)	no market
Sulphate of ammonia (for government)	$4.50

The Cleveland Welding & Mfg. Co., Cleveland, will build a power house as an addition to its plant.

Tool Men Expect Continued War

Equipment Dealers Give Little Heed to Exchange of Diplomatic Notes—Believe Tool Needs for War Work Will Grow Before Germany is Ready for Unconditional Surrender—Buying is in Small Lots

THAT little or no attention is being paid among the ranks of machine tool dealers and builders to the enemy's peace overtures, is indicated by the reports coming from different districts. The prevailing belief despite the peace talk, is that a period of many months intensive war effort lies ahead and many plans are being laid on that basis. Even among those in the East, who fear an early cessation of hositilities, but little apprehension exists for the reason that undoubtedly the government will make proper adjustment in connection with expenditures for plant enlargements or equipment. What little conjecturing exists along this line, occurs among concerns who have long-term government contracts. An additional appropriation of $1,110,000,000 to the ordnance department's original estimates of the cost of the artillery program, shows no let-up in the plan to furnish larger guns than ever to the enlarged army next year. It will shortly issue a list of thirty-two 36-inch lathes. Some tools are being purchased for the different arsenals, and among the many plants buying tools to produce shells is the Allis-Chalmers Mfg. Co., Milwaukee, at work on 6-inch projectiles. Other munition makers are adding to their equipment looking toward an increased supply of shells.

Few if any large lists are being issued, all buying in all districts is in small lots. Due to secretiveness maintained in connection with government installations of equipment, it is difficult to estimate the aggregate inquiry or buying. Shipyards it appears, are practically out of the market. A fair sized list of tools, including lathes, milling machines, drills, etc., is being issued by the Glenn L. Martin Co., Cleveland. This company's armored battleplane has been accepted by the government and it will now increase its production. Airplane manufacturers in general have been informed that they are not to buy any used machinery. An early rescinding of this order is anticipated since much of the used machinery in the market is said to be better adapted to such work than some of the new machines being offered and in addition, the second-hand equipment is better made in many cases than quickly-constructed new machinery.

Unlike the feverish activity that characterized the buying movement on the part of the railroads a short time ago, little machinery now is being purchased. The Delaware & Lackawanna railroad has bought some tools. The Pennsylvania and Nickel Plate roads continue to buy to piece out the equipment in their various shops. Many roads however have ceased to make purchases, since they have used up their entire appropriations. The engineers' depot has bought some tools for shipment to France.

Work on the proposed plant of the Baldwin Locomotive Works in Chicago is in abeyance and Henry Ford & Son, Dearborn, Mich., announce that the erection of the tractor plant at Hamilton, O., has been indefinitely postponed.

The crane market continues dull, with inquiry practically at a standstill. Among recent buyers are the following: Watertown arsenal, Watertown, Mass., Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, and the Pennsylvania railroad.

Peace Note Does Not Stop Ordnance Tool Buying

WHILE the situation in the eastern machine tool market appears rather dull, it is difficult, in view of the secretiveness which often attends transactions where government work is involved, to estimate the volume of current inquiry. It is apparent, though, that the shipyards are virtually out of the market and that demand from the railroads, while some sellers report a good inquiry, is not what it was a month or so ago. So far as can be ascertained, little in the way of big lists is being issued, and demand generally seems to be comprised of small miscellaneous lots.

The peace proposals of the enemy, in conjunction with the continued success of the entente and American armies has given rise to some conjecture on the part of manufacturers as to the status of their long-term contracts. This conjecture is chiefly over orders placed by companies relying for the most part on government backing, and is brought about principally by uncertainty as to how far this backing extends. There appears but little doubt that the government in these cases would see that a proper adjustment be made in the event of an early cessation of hostilities.

Included in the buying of the past week was a list of five or six tools for the Delaware & Lackawanna railroad. There was also some small buying by the Watertown arsenal, Watertown, Mass., the General Electric Co., Schenectady, N. Y., and the Engineering depot, Washington, for shipment to France. A list of about 32 36-inch lathes is expected to be issued shortly by the ordnance department, and that much further business of this character will be forthcoming was foreshadowed this week by a request of the ordnance department for an additional appropriation of $1,100,000 for extending its artillery program. Of considerable interest to the eastern machine tool trade is an unofficial report that the Baldwin Locomotive Works, Philadelphia, has abandoned plans for building its proposed $7,000,000 plant, which was to have been located in Chicago.

The crane market continues dull, with new inquiry at a virtual standstill. Included in the few transactions to be recently reported is a 10-ton crane, of 58 foot span, which is to be supplied by the Milwaukee Electric Crane & Mfg. Co. to the Watertown arsenal, Watertown, Mass. It is also understood that the Champion Engineering Co. was awarded two electric cranes by the William Cramp & Sons Ship & Engine Building Co., and that the Pennsylvania railroad placed several overhead cranes on which inquiries had been out for some.

Chicago Situation Is Unchanged

MACHINE tool dealers in Chicago find the situation unchanged from the past few weeks, with demand steady from small buyers but comparatively little large inquiry. Some munition makers are adding to

AGATHON

Alloy Steels

IN a few short years Agathon has attained to a success that will be as enduring as the Egyptian Pyramids.

This success was builded on solid foundations—our manufacturing methods—our electrically operated machines—unity, co-operation, and splendid working conditions have been the means of producing the very highest quality in Alloy Steel.

Nothing but the best would satisfy us.

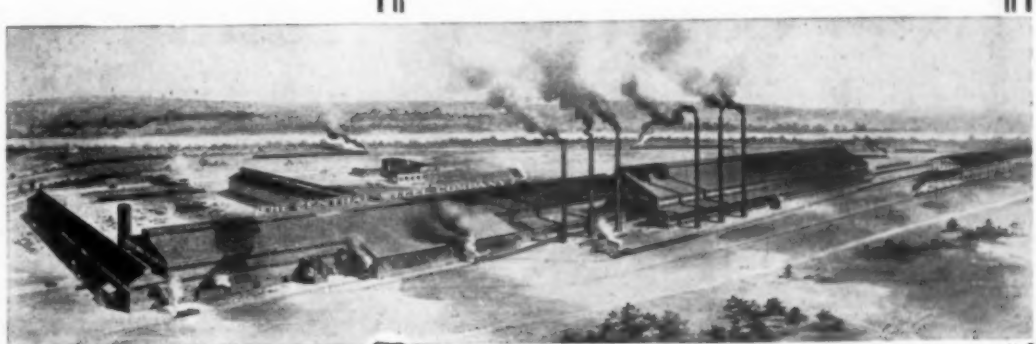
Nothing but the best should satisfy you.

THE CENTRAL STEEL CO.
Massillon, Ohio

Agathon Chrome Nickel
Agathon Chrome Vanadium
Agathon Nickel Steel
Agathon Special Analysis
Agathon Vanadium
Agathon Chrome Steel
Agathon High Carbon

Sales Offices

Detroit Office—326-27-28 Ford Bldg. F. Walter Guibert, District Representative.
Cleveland Office—Hickox Bldg. The Hamill-Hickox Company, District Representative.
Chicago Office—1370 People's Gas Bldg., 122 So. Michigan Blvd. C. H. Beach, District Sales Manager.
Philadelphia Office—603 Widener Bldg. Frank Wallace, District Sales Manager.
Syracuse Office—621 University Block. T. B. Davies, District Sales Manager.
Export Dept.—20 Broad St., New York.



their equipment in a comparatively small way. The Rock Island arsenal is buying only a few tools to round out its recent purchases, but it is understood further requirements are waiting appropriation. Second hand tools are difficult to buy as owners are holding prices somewhat higher than is considered in keeping with the situation. Most of those offered are of the less desirable types. The Allis-Chalmers Mfg. Co., Milwaukee, is planning to purchase additional equipment to manufacture 6-inch shells.

Warlike Spirit Is Displayed

DEALERS in machine tools and equipment in Cleveland refuse to be diverted by peace talk from their purpose to furnish tools for war work with as much speed as possible. Tool builders with whom they are in touch feel the same way. The prevailing and spreading belief is that the actual cessation of hostilities cannot be anticipated inside of many months and representatives of the machine tool industry are "digging in" on that basis.

As is the case in other territories no large installations are reported, small inquiries alone contributing to the large volume of business being transacted. With its armored battleplane accepted by the government after it had successfully passed all tests, breaking the altitude record by going 29,000 feet in the air, the Glen L. Martin Co., Cleveland, is entering the market. A large tentative list of requirements is out and some purchases have been made against it, which carry the 60-day cancellation privilege. Among the tools required immediately is one 6-inch x 14-inch x 8-foot geared head lathe. The Greenville Sand Co., Greenville, O., has issued a list, calling for several items, as follows: One 24-inch x 24-inch x 6-foot planer, one 16-inch shaper, one 25-inch throat shear and punch, one 16-inch x 8-foot x 4-foot lathe, one 25-inch x 50-inch gap lathe, one internal key-seater, one 20-inch drill press, wall and lever feed, one 32-inch radial drill, one 2½-inch bolt threading machine, one 9-inch x 2½-inch power hack saw, with wall guards, one 200-ton hydraulic press, one milling machine, one 48-inch swing lathe, and one 6-inch Cochran & Bly, No. B 4 circular saw. The Greenville Sand Co., wants new machines but believes it may have to take used equipment to obtain the desired deliveries.

Lack of material is holding up many purchases of equipment. Much equipment would be bought if the users could assure the sellers that they had the material on hand with which to work the machines. The Hydraulic Pressed Steel Co., Cleveland, would purchase a big press and some other large tools but for the fact that it is unable to obtain raw material. The Austin Co., Cleveland, has bought punching and shearing equipment, with which to fabricate steel for the two shell plants it is to build in St. Louis. The Matthews Engineering Co., Sandusky, O., is in the market for equipment with which to make auxiliary lighting plants for submarine destroyers and among other tools, has purchased three lathes. The American Multigraph Co., Cleveland, is in the market for a few No. O automatics, lathes, drill presses, etc. In the assembling plant turned over to the government by the Ford Motor Co., the American Multigraph is to enlarge its capacity for producing time fuses for shrapnel shells. It is learned on good authority that work on the tractor plant which Henry Ford & Son, Dearborn, Mich., contemplated erecting in or near Hamilton, O., has been indefinitely postponed. The Steel Products Co., Cleveland, is to erect a machine shop as well as an additional plant to manufacture airplane motor parts. Among other tools it is asking for, is one small horning press.

Railroad buying is not so extensive as it was a couple of months ago, several roads having used up their appropriations. The Nickel Plate continues to make purchases from time to time and now wants a 36-inch upright drill. Dealers await with interest the announcement scheduled to appear in a few weeks from Director General McAdoo as to the 1919 locomotive requirements of all railroads which will aggregate between 8000 and 10,000 engines and call for an outlay of between $480,000,000 and $600,000,000.

Used machinery dealers have learned with alarm that the government has issued instructions to airplane manufacturers that no used equipment shall be purchased. The Dayton-Wright Airplane Co., Dayton, O., is to erect an additional building. The Cambria Steel Co., Johnstown, Pa., is in the market for an 8-foot used boring mill.

Shipyards are not buying much material and appear to have satisfied their requirements for the present. The Lake & Ocean Shipbuilding Co., Cleveland, however, is calling for one used single end Cleveland punch and shear, with 28-inch throat. The ordnance department wants two No. 3 Cincinnati milling machines, and one motor-driven shear to cut 1¾-inch chrome steel rods.

Six 250-Ton Cranes Wanted for Neville Island

FREQUENT purchases of land by the steel companies are noted with a good deal of interest in the Pittsburgh machinery trade as a possible future lead to business, but while the news of land purchases is easy of confirmation, the buyers are noncommital as to the object or objects of the purchases. Meanwhile, new business drags to some extent and while more or less figuring is going on, for some reason, possibly the Liberty loan drive or the favorable tenor of the war news, few new contracts are being placed. A fairly steady stream of inquiries is flowing in from the railroads running west of Pittsburgh and cover a rather extensive line of shop tools. Some makers have fair sized stocks of small tools and those not thus situated offer comparatively short dates. On the larger lines, the best average delivery is six months. A revised inquiry for about six 250-ton cranes for Neville island has come out lately. Placing of orders for the gun plant requirements are probably some time off, as present activities center largely in getting up the open-hearth furnace plant, the concrete foundation of which already has been laid. Other buildings still are largely on paper. Little progress has been made in getting the government order for 33,000,000 semisteel shells lined up; several plants are experimenting, but the setting of prices and the awards are yet to be made and machinery orders cannot well be placed until those who take the shell orders have a clearer idea of their needs.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

MANCHESTER, N. H.—The New England Iron & Metal Co. has let the contract for a 2-story, 75 x 135 x 154-foot warehouse.

CANTON, MASS.—The Springdale Finishing Co. is building a corrugated iron, 1-story, 30 x 100-foot addition to its mill.

LEOMINSTER, MASS.—The F. A. Whitney Carriage Co. has let the contract for a brick, 3-story, 50 x 120-foot storehouse to cost $25,000, to replace that recently damaged by fire.

SALEM, MASS.—The Vibrotone Wire Mfg. Co. has been incorporated with $50,000 capital by J. A. Hunt, George M. Faulkner, Boston, and H. M. Newkirk.

SAGAMORE, MASS.—The Keith Car Mfg. Co. will build a brick, 1-story and basement, 50 x 150-foot building.

WORCESTER, MASS.—The Osgood-Bradley Car Co.

WAR SAVINGS STAMPS

has let a contract for the erection of a brick garage.

WEST HANOVER, MASS.—The National Fire Works Co. is to build a plant on King street.

GROTON, CONN.—Harry Zavoritis & Co., Bridgeport, Conn., will build a brick and stone, 4-story, 120 x 126-foot hotel with two 36 x 100-foot wings.

WATERBURY, CONN.—The Main Auto Radiator Works has been incorporated with $10,000 capital by Abraham Taninbaum, L. Taninbaum and Israel Taninbaum.

PORTLAND, CONN.—The Portland Foundry Co. recently purchased additional land and is enlarging the old plant of the U. S. Stamping Co.

NEW LONDON, CONN.—A $100,000 foundry will be erected here by the bureau of yards and docks, navy department, Washington.

Along The Atlantic Coast

BINGHAMTON, N. Y.—The Fairbanks Co. is arranging to build a foundry here.

BROOKLYN, N. Y.—The American Machine & Foundry Co., Fifty-sixth street and Second avenue, contemplates making several interior alterations.

BROOKLYN, N. Y.—The American Dock Co. has awarded the contract for a 1-story, 120 x 320-foot warehouse to the Ahlers Construction Co., 110 West Fortieth street, New York City.

BROOKLYN, N. Y.—The League Storage & Warehouse Co. is having plans drawn for a $15,000 warehouse. The proposed structure will be 1-story, 120 x 140 feet.

BUFFALO—Additions costing $30,000 will be erected at the plant of the National Aniline & Chemical Co., W. T. Miller, secretary, is in charge.

NEW YORK CITY—The Ordnance Engineering Co. has let a contract for the erection of buildings at Baldwin, L. I. The buildings will be 90 x 100, 31 x 100, 30 x 40, 31 x 31, 8 x 8, 15 x 20 feet.

OSWEGO, N. Y.—The Hessler Co. will rebuild its plant here at a cost of $40,000.

ROCHESTER, N. Y.—The Palmer Marsey Co. will build a $15,000 woodworking plant soon.

ROCHESTER, N. Y.—The Genessee Bridge Co. will build a fabricating shop, 60 x 65 feet.

ALTOONA, PA.—The Pennsylvania railroad is arranging to spend $2,000,000 for additions to its Juniata shops. Address chief engineer, Broad street station, Philadelphia.

BEAVER BROOK, PA.—The D. N. Dodson Coal Co. will install considerable electric equipment soon.

CHESTER, PA.—A 1-story, 25 x 100-foot machine shop will be erected by J. J. Puckrin.

EDGEMOOR, PA.—A $400,000 engine house and machine shop will be erected here by the Pennsylvania railroad. A. C. Shand, Broad street station, Philadelphia, is engineer in charge.

ERIE, PA.—The Modern Tool Co. has arranged to build a $10,000 addition to its plant.

ERIE, PA.—F. C. Kirkpatrick, Titusville, Pa., has let the contract to the Lackawanna Bridge Co. for the erection of two more shop buildings 60 x 100 and 60 x 80 feet.

ERIE, PA.—The Pittsburgh Steamship Co. has acquired a plot of ground on which it plans to erect a machine shop.

ERIE, PA.—The Modern Tool Co. is erecting additions to its plant, consisting of a building of brick and steel construction, 74 x 330 feet, two and three stories.

MARIETTA, PA.—The Pennsylania railroad is negotiating for a site here for railroad shops and a round house.

MEADVILLE, PA.—The Erie railroad has let the contract for extensive terminal improvements in its yards here.

MEADVILLE, PA.—E. R. Hall, Philadelphia, has the contract for the erection of an iron storage house here for the Meadville Iron Mfg. Co.

MERCER, PA.—The Mercer Gas & Water Co. has let the contract for improvements to its plant here.

MILTON, PA.—The Milton Mfg. Co. has awarded contracts for the construction of a $100,000 power house. The proposed building will be 1-story, 50 x 80 and 80 x 100 feet.

MILTON, PA.—The government, according to a recent announcement, will build a $350,000 power plant here. R. C. Marshall Jr., of the construction division of the national army, with headquarters at Seventh and B streets, Washington, is in charge.

NEW CASTLE, PA.—The Crescent Portland Cement Co., Wampum, Pa., has bought 18 acres of coal and limestone land in Big Beaver township and will increase its capacity.

NORTH EAST, PA.—The Eureka Co. is increasing its capacity by the erection of three new buildings.

NORTH EAST, PA.—The Electrical Materials Co. is contemplating the erection of a new plant here soon.

NOXEN, PA.—A $50,000 boiler house will be erected here for the Armour Leather Co., Chicago.

Government Inquiries

BIDS on the following equipment are desired by the navy department, bureau of supplies and accounts:

Machine tools, 5935½, Portsmouth.
Univeral shaping machines, 6162½, South Charleston.
Punching and shearing equipment, 6163½, Puget Sound.
Key seating machine, 6213½, Brooklyn.
Arbor presses, 6216½, Washington.
Machine tools, 6245½, Brooklyn.
Machine tools, electrically driven, 6293½, Washington.
Six turret lathes, 6330½, Washington.
Four centering machines, 6334½, Norfolk.
One screw-cutting lathe, 6335½, Jupiter.
Two polishing and grinding machine, 6336½, Newport.
Two internal grinders, 6338½, Newport.
One screw machine, 6339½, Newport.
Thirty-three engine lathes, 6340½, Alexandria, Va.
Two bench lathes, 6341½, Newport.
Machine tools, 6388½, Puget Sound.
Two scarfing machines, 6389½, Norfolk and Puget Sound.
Two sensitive drills, 6390½, Charleston.
Machine tools, stay bolts, taps and dies, 6397½, San Francisco.
Two grinding machines, 6398½, Alexandria, Va.
One screw slotter, 6399½, Philadelphia.
Squaring shears, 6496½, Washington.
Four traveling cranes, 6497½, Washington.
One swing drill, 6499½, Paris Island.
Toolroom grinders and lathes, 6500½, Hingham, Mass.
One bevel shear, 6502½, Norfolk.
Three bench lathe, 6505½, Norfolk.
One vertical boring mill machine, 6510½, Puget Sound.
Two belt-driven planers, 6511½, f.o.b. works.
Forty-one heavy duty engine lathes, 6522½, Norfolk.

Schedule numbers, dates of opening and places of delivery follow the specifications of the tools.

NEWARK, N. J.—Franklin Williams, Inc., will build a 1-story, 50 x 150-foot plant for light foundry work. Marshal Shoemaker, architect, is drawing plans.

NEWARK, N. J.—C. P. Massey Co., Passaic river and Blanchard street, will erect a 1-story factory, 80 x 216 feet.

PHILLIPSBURG, N. J.—The Ingersoll Rand Co. recently let a contract for an addition to its plant to cost about $17,000.

ROSELLE, N. J.—The Roselle Machine & Tool Co. has been incorporated with $50,000 capital to manufacture machinery. Frank Tracz, of Roselle, and Martin Czany, of Jersey City, are the incorporators.

WEST ORANGE, N. J.—The F-S Machine Specialties, Inc., has been incorporated with $25,000 capital to manufacture tools and factory supplies. Henry W. Schulman, West Orange, and Alexander Altschuler, New York, are the incorporators.

BALTIMORE—The contract for a $150,000 addition has been awarded by the Union Shipbuilding Co. to the Hughes Foulkrod Co., Chestnut street, Philadelphia.

HAGERSTOWN, MD.—An addition will be erected at the plant of the Maryland Pressed Steel Works.

WOODBURY, MD.—The Poole Engineering & Machine Co. will build a 1-story, 30 x 105-foot forge shop addition.

Westinghouse, Church, Kerr & Co., 37 Wall street, New York City, are drawing plans.

PHILADELPHIA—J. S. Kennedy has received a contract for erecting a 1-story, 50 x 125-foot machine shop addition for F. K. Pierson, Jr.

PHILADELPHIA—The American Insulation Co. has awarded a contract to William Steele & Sons for a $250,000 plant.

PITTSBURGH, PA.—The Pittsburgh Mining Machinery Co. is arranging to build a machine shop.

PITTSBURGH—The Pittsburgh Rolling Mill & Forge Co. has been incorporated with $5000 capital by W. I. Miller and others.

PITTSBURGH—The Keystone Brass Foundry has been incorporated by Leo Einstein and others, with a capital of $37,500.

PITTSBURGH—The Fuller Steel & Iron Co. recently was incorporated with $10,000 capital by James R. Fuller, William L. Fuller and Jerome Wolff, Crafton, Pa.

PITTSBURGH.—Construction work has been started at Springdale, Pa., upon a power generating plant which, it is expected, will supply current to many industries in the Pittsburgh district. The new station, according to reports, is being financed by the government and the West Penn Power Co., Pittburgh.

READING, PA.—The Reading Brass Works has been incorporated with $10,000 capital by Arthur R. Wicklein and others.

SHARPSBURG, PA.—The Pittsburgh Crane & Equipment Co., Phipps Power building, Pittsburgh, has let the contract for a machine shop 50 x 100 feet.

SHARPSVILLE, PA.—The Sharpsville Boiler Works Co. is erecting a steel addition, 75 x 110 feet. A contract also has been let by the company for the erection of a storehouse and power house.

BLENHEIM, N. J.—The Simplex Valve & Meter Co. will erect a 1-story brick factory building. Lewis Shay is architect.

CAMDEN, N. J.—Work will be started shortly on a $5000 addition to the plant of the Reeves Stove & Foundry Co.

CAMDEN, N. J.—The Eastern Machinery Equipment Co. will erect a 1-story factory building, 45 x 112 feet.

CAPE MAY, N. J.—Sherman S. Sharp has been awarded a contract by the navy department for the building of marine headquarters at Tuckerton, N. J., at a cost of $26,500.

NEWARK, N. J.—The John Campbell Co., Plum Point lane, will erect a storage house, to cost $8500.

NEWARK, N. J.—John Strum & Sons have awarded a contract for the construction of a $20,000 wagon factory.

OHIO STEEL CASTINGS

Quality PLUS Service

The whirring of the airplane—the roaring of the fast express—the thundering chug of the rapidly approaching motor truck, all *proclaim the victory of Ohio Steel Castings over "Power"* by proving the ability of these castings to withstand the terrific, racking, straining shocks of the mightiest engines constructed by man.

If you are in need of Tractor, Motor Truck, Automobile or other small castings—castings of a quality and strength fit for the most strenuous service specify *Ohio Steel Castings.*

Let us figure on your requirements.

The Ohio Steel Foundry Co.

Plants

Springfield, Ohio Lima, Ohio Bucyrus, Ohio

Central States Activities

ALTOONA, WIS.—Sealed bids are being taken by C. J. Hayden, city clerk, for the construction of a complete water works system. Bids close Oct. 15, at 2 p. m.

APPLETON, WIS.—The Wagner-Walter Co. has been organized by Henry Walter and Michael Wagner, Jr., and leased the former Stark building on College avenue, which is being equipped as a machine shop.

MANITOWAC, WIS.—Plans for the establishment of a modern equipped foundry are being made by the Manitowac Shipbuilding Co.

MANITOWAC, WIS.—Recent announcement of sale of Manitowac Foundry & Machine Co. to David Balkansky is followed by the statement the plant will be enlarged.

MILWAUKEE—A 1-story brick and concrete shop addition, 30 x 75 feet, is being erected by the Dings Magnetic Separator Co., 671-681 Smith street. The work has been let to Ed. Steigerwald & Co. and is now under way.

RACINE, WIS.—A new office building will be erected by the Tecktonius Mfg. Co. at Thirteenth and Racine streets.

SHEBOYGAN, WIS.—The Standard Oil Co., Brumder building, Milwaukee, is building an engine house and loading platform, 30 x 75 feet and contemplates the erection of a new warehouse here.

BAY CITY, MICH.—The City Foundry Machine Co. recently let a contract for the erection of a building, 100 x 110 feet.

DETROIT—The Hoskins Mfg. Co. recently let contracts for the erection of additions to its factory.

CHICAGO—The U. S. Ball Bearing Mfg. Co., A. A. Strom president, is building a brick addition, 81 x 84 feet, at its plant, 4535 Palmer street.

CHICAGO—The Gardiner Metal Co., Robert C. Gardiner president, 1364 West Lake street, is building a one and two-story factory.

GALESBURG, ILL.—The Dependable Truck & Tractor Co., recently started erection of a plant. One building is to be 50 x 90 feet, of brick.

CANTON, O.—A permit recently was issued to the Canton Steel Foundry Co. permitting it to erect a $10,000 addition to its plant. The contract for the work has been let to the Boldt Construction Co.

CLEVELAND—The Standard Oil Co. recently let a contract for the erection of a building to cost about $5000.

CLEVELAND—The Mathews Mfg. Co., R. M. Mathews general manager, has had plans prepared for the erection of a shipbuilding plant at Rocky River. It is said the plant will cost about $75,000.

CLEVELAND.—The general contract for the erection of a boiler house at the garbage disposal plant has been awarded to the Kelly-Demarest Construction Co., American Trust building.

CLEVELAND.—Engineer R. Winthrop Pratt, Hippodrome building, is working on the plans for a filtration plant for Wyandotte, Mich. The bond issue for this improvement has been approved by the capital issues committee.

CLEVELAND—The Buchard Roberts & Wales Co. has taken out a permit for the erection of a machine shop for the Steel Products Co. The building will be 88 x 123 feet and will cost about $30,000.

DAYTON, O.—The Dayton Pneumatic Tool Co. will begin at once the erection of a $35,000 addition to its plant.

DAYTON, O.—The Dayton-Wright Airplane Co. has placed a contract for the erection of a building to cost about $65,000.

DAYTON, O.—The Advance Foundry Co. is erecting a plant of brick and steel construction, 100 x 200 feet. Several other smaller buildings that are necessary in the operation of a foundry also are to be erected. When completed, the plant will be equipped with modern machinery, including cranes, sand blast, pneumatic tools, etc.

HAMILTON, O.—Work on the new crane yard at the Hooven-Owen-Rentschler plant is expected to start immediately.

Business Changes

WITH an increase in capitalization from $150,000 to $500,000, the Traverse City Motor Car Co., Detroit, has changed its name to the Napoleon Motors Co., with W. J. Chase as president.

The Elliott Electric Co., Cleveland, has removed from 322-328 Champlain avenue to 813-815 Superior avenue, N. W., where it will occupy five floors and a basement. The change was made necessary by the company's increasing business in electrical jobbing, motor sales, repairs and rentals.

The Standard Semi-Steel Foundry Co., Harrisonville, Mo., has moved to Clinton, Mo. The company will have its plant and office headquarters at Clinton, and the personnel will remain the same.

The Jernberg Metal Treating Co., Worcester, Mass., has changed its name to the Greenman Steel Treating Co. Ralph V. Jernberg, who founded the business about four years ago has disposed of his interests to Lawrence P. Greenman, who becomes president and treasurer of the company, a Massachusetts corporation.

HAMILTON, O.—Building Inspector Braun recently issued a building permit to the Long & Allstatter Co. for the erection of a foundry building to cost $83,000.

MANSFIELD, O.—The Hughes Keenan Co. will award contracts soon for the erection of a 1-story brick factory.

STEUBENVILLE, O.—The Clay Casting Co. plant at New Cumberland is being converted into a general ware plant and will be put in operation as soon as new machinery is obtained.

URBANA, O.—Plans are being drawn for the United States Paperboard Co. for the remodeling here of its factory which recently was damaged by fire.

WAPAKONETA, O.—The Wapakoneta Machine Co. recently started on the erection of an addition to its facory. The building will be 50 x 80 feet and will be utilized for the tempering and hardening department.

YOUNGSTOWN, O.—The Mahoning Foundry Co. has a permit for the erection of a brick and steel foundry. Adjoining the building the company plans the construction of a large warehouse.

LOUISVILLE, KY.—The Louisville Lead and Color Co., 223 North 15th street, has let the contract to C. A. Koerner & Co. for the erection of a plant.

WINCHESTER, KY.—The Blue Grass Box Mfg. Co., of Charleston, W. Va., has been organized with capital of $50,000 by Charles B. English, Charleston, and others, and will build a plant here.

CHATTANOOGA, TENN.—The Chattanooga Iron & Coal Corp., which recently suffered heavy damage by fire, is to make extensive improvements.

CHATTANOOGA, TENN.—The Lucey Foundry & Machine Co., capital $300,000, has been incorporated by J. B. Higgins, J. P. Hoskins, W. H. Dewitt, R. H. Williams and George D. Lancaster. Extensive improvements are to be made to the plant of the Chattanooga Car & Foundry Co., recently purchased by the Lucey interests.

BARBOURSVILLE, W. VA.—The Huntington Clay Products Co. has started work on an addition to its brick plant here.

FAIRMONT, W. VA.—The Columbia Gas Co. will rebuild its plant here which was burned a short time ago.

WELLSBURG, W. VA.—The Eagle Glass & Mfg. Co. has let the contract to B. A. Cresap, Wellsburg, for the erection of an addition to its plant.

WHEELING, W. VA.—The Wheeling Traction Co. has let the contract for a repair shop, 125 x 130 feet.

Business In Canada

NANAIMO, B. C.—The department of public works, Ottawa, Ont., will shortly embark on an extensive shipbuilding program, to cost $15,000,000. R. C. Desrochers, Ottawa, Ont., is secretary of the department.

VANCOUVER, B. C.—The Tudhope Electric Metals Co. has awarded a contract for the construction of a foundry to the Cotton Co., Ltd. The main building will be 50 x 100 feet.

VICTORIA, B. C.—Willingness of the Canadian Pacific railway to enter at once into an agreement for the bridging of the inner harbor at Johnson street was expressed by Lord Shaughnessy at a recent conference which he held with high officials of the road. Two bridges may be constructed.

BRAMPTON, ONT.—The Hercules Rubber Co. is in the market for two 100-horsepower boilers and one 200-horsepower engine.

BRANTFORD, ONT.—Ker & Goodwin, 256 Colborne street, will begin at once to build a munitions plant to cost $35,000.

BRANTFORD, ONT.—The Brantford Computing Scale Co., Ltd., has been incorporated to manufacture scales, slicers, machinery, products from iron, steel, copper, etc., with $500,000 capital stock, by Dufferin T. Williamson, Archibald L. McPherson, Edward Cutmore and others.

CHATHAM, ONT.—An agreement has been signed between the city and the Denby Motor Trucks Co. calling for the erection of a plant here to be ready for operation next spring, at a cost of $200,000.

GUELPH, ONT.—The Jackson Signal Co., Ltd., has been incorporated to manufacture railway signal torpedoes, fuses and other railway devices, with $40,000 capital stock, by George B. Jackson, Walter E. Buckingham, Archibalt Holm and others.

HAMILTON, ONT.—The Dominion Windshield Corp., Ltd., has been incorporated to manufacture automo-

The Sivyer Service of providing Electric Steel castings has for its objects the decrease of machining costs and the increase of wearing-quality and life. Both are attained by methods which result from long experience and begin with the design of the casting itself. When we find that a casting we are asked to furnish is of a design not consistent with good foundry practice, we study its function in the completed unit and offer the necessary suggestions to make it a really practicable casting job without affecting in any way its function and efficiency in the completed unit.

Secondly, Sivyer Service analyzes the functions of the casting and specifies the proper composition steel for the job; long experience with carbon and alloy steels has enabled us to reduce costs and increase quality remarkably for many different industries.

Thirdly, Sivyer Service makes a careful study of the pattern and molding problem involved, for improper gating and insufficient risers are often the greatest wasters of metal and machining labor.

Fourthly, Sivyer Service analyzes carefully the proper annealing methods to be used and controls their proper application through unfailingly efficient equipment and men. In short the Sivyer Service supervises every step necessary to secure unusually and unfailingly good castings of electric steel. It never relies on one factor alone, relies very little on the natural freedom of electric steel from occluded gases nor even on its commonly recognized merit in resisting crystallization. It also depends but little on the inherent scientific accuracy of the electric furnace process. From casting-design to sand-blasting and tumbling, the fundamental superiority of Sivyer Steel is due to its men and metal. Their value is best proved by the fact that, although the production of steel castings is generally looked upon as a local one, the Sivyer market is national.

SIVYER S CASTINGS

CAST crank shafts for coal handling machinery caused the Roberts & Schaefer Co. much trouble until they came to us with a request to determine the steel proper for these castings. After careful analysis we recommended Sivyer Vanadium Electric Furnace Steel with a special carbon content, providing stiffness enough for the arduous work without loss of the necessary toughness and strength. This careful specification of the proper metal is one of the many factors in Sivyer Service that has set free the demand for Sivyer Castings from the usual local limits and made it nation-wide.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

biles, parts, accessories, windshield cleaners, etc., with $50,000 capital stock, by Stanley H. Slater, George A. Hancock, Percy W. Springer and others of Hamilton.

KITCHENER, ONT.—The Guarantee Liquid Measure Co., Ltd., has been incorporated to manufacture measures, pumps, etc., for measuring gasoline and other liquids, etc., with $50,000 capital, by Arthur V. Phillips, Lloyd H. Phillips, David S. Bowlby and others, all of Kitchener.

LONDON, ONT.—Plans will be prepared immediately for the erection of a motor truck factory for the General Motor Co., Pittsburgh, to cost $50,000. T. K. King, care of Gordon Philip, city hall, London, Ont., is general manager.

ORILLIA, ONT.—The Electric Irons, Ltd., has been incorporated to manufacture electrical equipment, machinery, tool, implements, iron, steel and other metals, etc., with $45,000 capital, by James B. Tudhope, William H. Tudhope, Robert L. Whitman and others, of Orillia.

OTTAWA, ONT.—The Beach Foundry Co. is contemplating the erection of a new plant, construction work to be started next spring.

TORONTO, ONT.—The Canadian Cartridge Co., Sherman avenue, has started work on the erection of an addition to its plant.

TORONTO, ONT.—The Turnbull Elevator Mfg. Co., 126 John street, will build an addition to its boiler house.

TORONTO, ONT.—Norman Taber, 444 Bathurst street, is in the market for a 50 horsepower high-speed automatic governor.

TORONTO, ONT.—The factory owned by the Canadian Wood Products, Ltd., 1000 Gerrard street, was damaged by fire recently with a loss of $50,000, of which $10,000 was to machinery.

TORONTO, ONT.—The Universal Cartridge Co., Ltd., has been incorporated to manufacture cartridges, munitions, explosives, etc., with $2,000,000 capital stock by James Ross, Toronto, Ont.; James B. Tudhope, William H. Tudhope and others of Orillia, Ont.

WALKERVILLE, ONT.—The Dominion Forge & Stamping Co., Ltd., is in the market for a guillotine-type steel shears, with a capacity for shearing up to five inches round.

WELLAND, ONT.—The Utility Electric Mfg. Co. is in the market for an electric spot welder.

DALHOUSIE, N. B.—The Dalhousie Lumber Co. will build an addition to its mill and is in the market for fire extinguishers, steam engines, shafting, belting, pulleys, feed pump, boilers, iron stack, sprinklers, motors, switchboard, belt and bucket conveyors, etc.

HALIFAX, N. S.—The Halifax Shipyards, Ltd., Barrington street, has let the general contract to the Bedford Construction Co., Bank of Commece building, for the erection of a 1-story machine shop.

MONTREAL, QUE.—H. Chagnon & Co., 27 Burnett street, will build a sash and door factory, to cost $6000.

MONTREAL, QUE.—The Olivers Motors, Ltd., has been incorporated to manufacture automobiles, motors, engines, etc., with $20,000 capital, by C. J. Ogden, L. J. L'Heureux and others, of Montreal.

MONTREAL, QUE.—The Aircraft Mfg. Co. of Canada, Ltd., has been incorporated to manufacture airplanes, machinery, motors, engines; etc., with $525,000 capital, by Robert C. McMichael, Daniel P. Gillmor, Gerald A. Coughlin and others of Montreal.

MONTREAL, QUE.—The Canadian Johns-Manville Co., Ltd., has been incorporated to manufacture machinery, tools, implements, asbestos, etc., with $2,500,000 capital, by Gordon W. MacDougall, Lawrence Macfarlane, Linton H. Ballantyne and others, of Montreal.

THEDFORD MINES, QUE.—The Canadian Crude Asbestos & Fibre Corp., Ltd., has been incorporated to carry on a general mining business with $20,000 capital, by Alexander H. Duff, Maurice Goudrault, Jean L. Muir and others of Montreal, Que.

THREE RIVERS, QUE.—The Tidewater Shipbuilding Co. proposes to build marine engines, boilers, etc., and is erecting buildings and installing machinery and tools, at a cost of $500,000.

THREE RIVERS, QUE.—Plans have been prepared for the erection of a 2-story addition to the plant of the Three Rivers Shipyards, Ltd. The company is in the market for common band saws, band saws working on table at angle 45 degrees on right and left, large planers, machinery for punch house, etc. John Bourgeois, 144 St. Francois Xavier street, is engineer.

The Pacific Northwest

OLYMPIA, WASH.—Among highway improvement projects approved by the state commission recently, is one calling for the erection of a 384-foot steel bridge to cost $18,364 in the town of Okanogan.

SEATTLE.—The Skinner & Eddy Shipbuilding Corp., 1201 Railroad avenue, has a permit to erect a $20,000 power house.

SEATTLE.—Bids will be received until Oct. 23 by the port of Seattle commission at the Bell street warehouse for furnishing steel rails, etc., for what is known as the Smith cove improvement of the port of Seattle.

PORTLAND, OREG.—The engineering department of the Willamette Iron & Steel Works has prepared plans for a 15-ton derrick to be installed at the plant.

PORTLAND, OREG.—McDougall & Overmire Co., Sherlock building, has been granted a permit to erect a $10,000 machine shop at Water and Hawthorne streets. Jacobberger & Son are the architects. The owners will do the building.

PRINEVILLE, OREG.—At a special election recently held here, a bond issue of $85,000 was voted for the City of Prineville railroad. The amount will be used for improving the track and depot buildings.

New Trade Publications

LOCK WASHERS:—An attractive 36-page catalog containing data and illustrations of lock washers manufactured by the Reliance Mfg. Co., Massillon, O., is being circulated to the trade. All kinds and sizes of the washers are given in the booklet.

METAL CHAIRS:—The Royal Metal Mfg. Co., Chicago, is circulating to the trade a booklet containing illustrations, etc., of metal chairs which it manufactures. Several sizes and types of the metal chairs, suitable for all kinds of hard usage are shown in the booklet.

SAND BLAST:—Principles and data of sand-blasting are given in a large 4-page booklet recently published by the Pangborn Corp., Hagerstown, Md. The treatise is concise and to the point, full data on sand-blasting methods being given. Several tables are given. The booklet contains several illustrations of sand-blasting machinery.

ELECTRICAL EQUIPMENT:—The General Electric Co., Schenectady, N. Y., recently published a 20-page bulletin containing a treatise on the use of electricity in an iron foundry. The booklet is instructive and well written, and contains illustrations of cranes, magnets, electric trucks, air compressors, pumps, etc., all of which are driven by electricity. The booklet is now being circulated to the trade.

SCALES:—The Standard Scale & Supply Co., Pittsburgh, is circulating to the trade a large catalog in which several types of scales are described and illustrated. A rolling-mill scale is among those described. It is built low and its platform is protected by long projecting horns, so that large plates can be passed over the scale without interference. The scale is built in three sizes, ranging from a capacity of 2500 pounds to 10,000 pounds.

GENERATORS:—A catalog recently issued by the International Oxygen Co., New York, describes and illustrates the latest improved electrolytic oxyhydrogen generator developed by the company. The booklet gives dimensions and capacities of the generator and presents two typical generator plant layouts of common capacity, showing the extreme compactness of this improved generator. The description of the generator is complete.

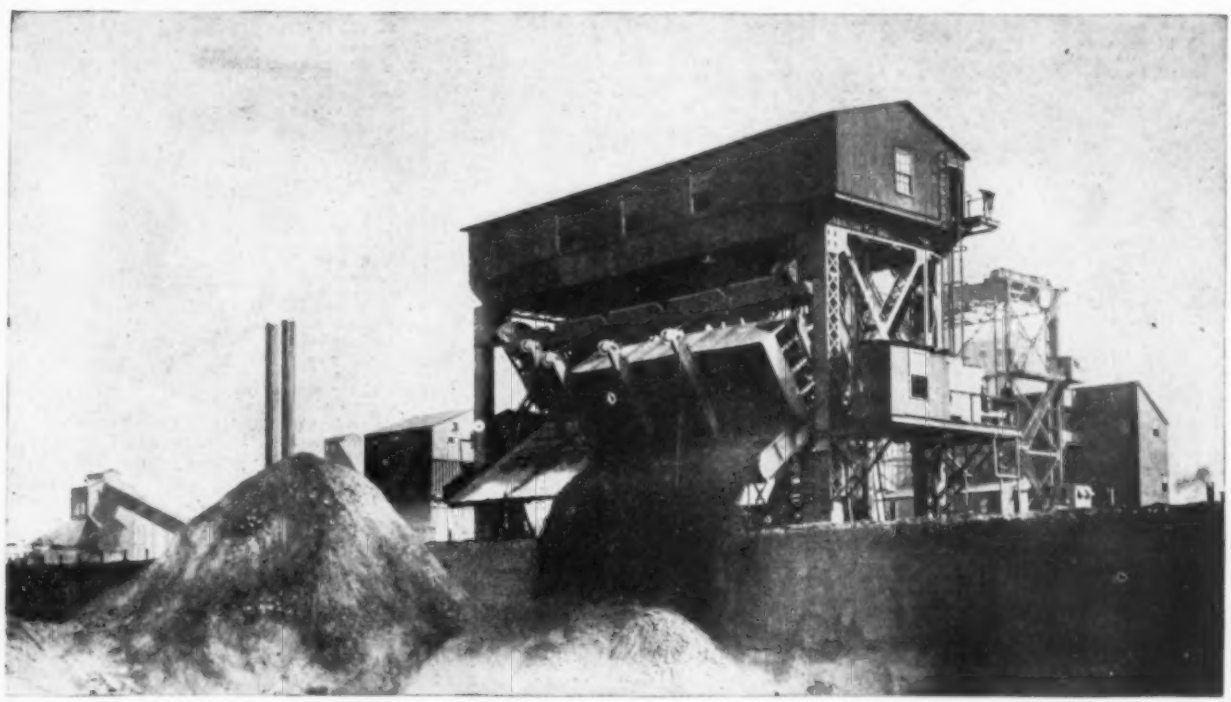
MACHINE TOOLS FOR MAKING SHELLS—An illustrated catalog of machine tools has recently been issued by the A. R. Williams Machinery & Supply Corp., New York. The catalog is of the loose-leaf variety, which readily lends itself to the addition of new mateiral that may be issued from time to time. Among the tools listed are: Cutting-off machines, bottoming machines, turret lathes, engine lathes, presses for shell nosing, hardening and annealing furnaces, thread milling machines and a waving and undercutting attachment for use in making shrapnel. This attachment is made in different sizes and is designed for waving and undercutting the copper band groove on all sizes of shells.

BUCKET LOADER:—A 4-page leaflet is being circulated by the National Engineering Co., Chicago, in which is described a bucket loader. The bucket is used principally in the automatic loading of foundry sands, in connection with the Simpson mixer. According to the booklet, it will hold a correct amount of sand, for whatever size of mixer it is being used with. The power required to drive the bucket is taken from the driving shaft of the mixer itself, and by means of a clutch mechanism the bucket is elevated to a point where the material falls into the machine, and is lowered against a brake for the next charge. It requires but a 5-horsepower motor to operate the loader.

PORTABLE HOIST:—The Canton Foundry & Machine Co., Canton, O., is circulating to the trade an attractive 34-page booklet, accompanied by a supplement, in which a portable crane and hoist is described and illustrated. This small hoist, which is a combination of hoist, crane and truck, is invaluable as an auxiliary to the overhead cranes. It is built in many sizes and is made of semisteel. The load is raised with a lifting crank on the gear shaft and can be locked at any point by means of a pawl and rachet. The yoke rests on an eccentric axle, which is thrown back by raising the handle against the arm. The weight of the machine then rests on two small front wheels. When the handle is pulled down, the axle lifts the weight from the wheels and the entire load is carried by the yoke.

W-S-M

STEEL PLANT EQUIPMENT
COKE OVEN MACHINERY
GAS PRODUCERS
ORE AND COAL HANDLING MACHINERY
SPECIAL CRANES
MINING MACHINERY
HYDRAULIC TURBINES



Ore and Coal Handling Machinery

To those contemplating the erection of plants for the loading, unloading, conveying or storage of ore or coal, we offer the exceptional experience of our engineering staff, supplemented by extensive and modern manufacturing facilities.

Specific inquiries are invited.

The Moving Car Dumper illustrated was built for the Youngstown Sheet & Tube Co. This Machine unloads into storage 300 cars per day.
Bulletin A9, "W-S-M Car Dumpers" contains much interesting information. Write for your copy.

THE WELLMAN-SEAVER-MORGAN CO.

CLEVELAND, OHIO, U.S.A.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports	
Old range Bessemer, 55 iron	$6.65
Mesabi Bessemer, 55 iron	6.40
Old range non-Bess., 51½ iron	5.90
Mesabi non-Bess., 51½ iron	5.75

WAREHOUSE PRICES

Steel bars, Chicago	4.17c
Steel bars, Cleveland	4.07c
Steel bars, Detroit	4.13c
Steel bars, Philadelphia	4.13c
Steel bars, New York	4.145c
Steel bars, St. Louis	4.24c
Steel bars, Cincinnati	4.13c
Steel bars, St. Paul	4.395c
Steel bars, Buffalo	4.10c
Iron bars, Buffalo	4.70c
Iron bars, Chicago	4.77c
Iron bars, Cleveland	4.67c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.84c
Iron bars, Cincinnati	4.13c
Iron bars, Philadelphia	4.73c
Iron bars, New York	4.745c
Shapes, Chicago	4.27c
Shapes, Detroit	4.23c
Shapes, St. Louis	4.34c
Shapes, St. Paul	4.495c
Shapes, New York	4.245c
Shapes, Cleveland	4.17c
Shapes, Philadelphia	4.23c
Shapes, Buffalo	4.20c
Shapes, Cincinnati	4.23c
Plates, Buffalo	4.45c
Plates, Chicago	4.52c
Plates, Detroit	4.48c
Plates, St. Louis	4.59c
Plates, St. Paul	4.745c
Plates, New York	4.495c
Plates, Cleveland	4.42c
Plates, Philadelphia	4.48c
Plates, Cincinnati	4.48c
No. 10 blue ani. sheets, Chicago	5.52c
No. 10 blue ani. sheets, Cleveland	5.42c
No. 10 blue ani., Buffalo	5.45c
No. 10 blue ani. sheets, St. L.	5.59c
No. 10 blue ani. sheets, Cincinnati	5.48c
No. 10 blue ani. sheets, St. Paul	5.745c
No. 10 blue ani. sheets, Detroit	5.48c
No. 28 black sheets, Chicago	6.52c
No. 28 black sheets, Cleveland	6.42c
No. 28 black sheets, Cincinnati	6.48c
No. 28 b'ack, Detroit	6.48c
No. 28 black sheets, St. L.	6.59c
No. 28 black sheets, St. Paul	6.745c
No. 28 galv. sheets, Chicago	7.77c
No. 28 galv. sheets, Cleveland	7.67c
No. 28 galv. sheets, Cincinnati	7.73c
No. 28 galvanized, Detroit	7.73c
No. 28 galv. sheets, St. L.	7.84c
No. 28 galv. sheets, Buffalo	7.70c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$24.50 to 25.00
Bundled sheets, Pittsburgh	28.00 to 29.00
Bundled sheets, Cleveland	26.00 to 27.00
Bundled sheets, Buffalo	25.00 to 26.00
Boiler plate, cut, No. 1, Chicago	28.00 to 28.50
Boiler plate, cut, No. 1, St. Louis	26.50 to 27.00
Frogs, switches, guards, St. Louis	28.50 to 29.00
Frogs, switches, guards, Chicago	29.00
Heavy melting steel, Pittsburgh	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chicago	29.00
Heavy melting steel, Cleveland	29.00
Heavy melting steel, Cincinnati	28.50 to 29.00
Heavy melting steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.00
Heavy melting steel, St. L.	28.50 to 29.00
Heavy melting steel, Birmingham	27.00 to 28.00
Baled sheets, Cleve'and	28.50 to 29.00
Ba'ed sheets, Pittsburgh	28.00 to 29.00
Baled sheets, Chicago	29.00
Knuckles, couplers, Chicago	$4.00
Knuckles, couplers, St. Louis	33.00 to 33.50
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. crops, eastern Pa.	39.00
Low phos. guaranteed E. Pa.	36.50
Shoveling steel, Chicago	29.00
Shoveling steel, St. Louis	28.00 to 28.50
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	32.50 to 33.00
Steel rails, old, Birmingham	29.00 to 30.00
Stove plate, Chicago	29.00
Stove plate, Cincinnati	23.00 to 23.50
Stove plate, St. Louis	25.50 to 26.00
Stove plate, N. J. points	27.25
Stove plate, Birmingham	25.00 to 26.00
Stove plate, Buffalo	28.50 to 29.00
Stove p.ate, eastern Pa.	29.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	29.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$1.40
Newark, N. J.	4.40
Boston	4.60
Philadelphia	4.10
Pittsburgh	1.40
St. Louis	4.60
Minneapolis, St. Paul	5.70
Buffalo to:	
Albany, N. Y.	$1.75
New England (rail)	3.90
New York and Brooklyn (rail)	3.90
Virginia furnaces to:	
Philadelphia	$4.10
New England	4.70
Brooklyn, Jersey City, Newark	4.40
Birmingham, Ala., to:	
Boston	$8.00
Cincinnati	3.60
Chicago	5.00
Cleveland	5.00
Louisville, Ky.	3.30
Minneapolis, St. Paul	7.30
New York	7.70
Philadelphia	6.50
Pittsburgh	6.10
Savannah, Ga.	3.40
St. Louis	4.25
Chicago to:	
Des Moines	$3.50
Minneapolis, St. Paul	2.50
Milwaukee	.60
Moline, Ill.	1.40
Omaha	4.50
St. Louis	1.90
Ironton and Jackson, O., to:	
Chicago	$3.75
Cincinnati	1.75
Cleveland	2.40
Detroit	2.60
Indianapolis	2.30
Minneapolis, St. Paul	5.70

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	24.5 cents
Philadelphia	23.0 cents
Boston	27.0 cents
Buffalo	21.5 cents
Baltimore	22.5 cents
Cleveland	17.0 cents
Cincinnati	23.0 cents
Chicago	27.0 cents
Detroit	23.0 cents
Minneapolis and St. Paul	40.5 cents
Denver	$1.09
St. Louis	33.5 cents
New Orleans	38.5 cents
Birmingham	57.5 cents
Pacific coast (all rail)	$1.25
Pacific coast (tin plate)	1.25

IRON MILL USE

Busheling, No. 1, Cleveland	30.50 to 31.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 1, Pittsburgh	30.00 to 30.50
Busheling, No. 1, Cincinnati	26.00 to 26.50
Busheling, No. 1, Chicago	30.50 to 31.00
Busheling, No. 2 Chgo.	21.50 to 22.50
Busheling, No. 1, St. Louis	30.00 to 30.50
Cast borings, New York	16.75 to 16.90
Cast borings, eastern Pa.	19.00
Cast borings, Buffalo	18.00 to 19.00
Cast borings, Cleveland	19.00
Cast borings, Cincinnati	17.00 to 18.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	17.00 to 18.00
Cast borings, Chicago	18.00 to 19.00
Cast borings, St. Louis	18.50 to 19.00
City wrought, long, N. Y.	30.00
Cut forge, Chicago	32.50 to 33.00
Forge No. 1, eastern Pa.	28.00 to 29.00
Grate bars, Buffalo	27.50 to 28.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	27.25
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.50 to 44.00
Iron axles, Cleveland	46.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	34.00 to 35.00
Iron rails, St. Louis	38.50 to 39.00
Iron rails, Cleveland	37.00 to 38.00
Machine turnings, Cincinnati	18.00 to 18.50
Machine turnings, Cleveland	19.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.75 to 16.90
Machine turnings, Pittsburgh	18.00 to 19.00
Machine turnings, east. Pa.	19.00
Machine turnings, Birmingham	16.00 to 17.00
Machine turnings, Chicago	18.00 to 18.50
Machine shop turnings, St. Louis	18.50 to 19.00
Pipes and flues, Cleveland	28.00 to 29.00
Pipes and flues, Chicago	29.00
Pipes and flues, St. Louis	27.50 to 28.00
R. R. mach. cast, No. 1, Buffalo	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt. No. 1, east Pa.	34.00
Railroad wrgt. No. 1, Cincinnati	33.50 to 34.00
Railroad wrgt., No. 1, Cleveland	34.00
R. R. wrought, No. 1, Pittsburgh	34.00
Railroad wrgt., No. 2, Chicago	32.50 to 33.00
Railroad wrought, No. 1, Chicago	33.50 to 34.00
R. R. wrought, No. 1, Birmingham	31.00 to 34.00
No. 1 yard wrought, Eastern Pa.	33.00
No. 1 bushelings wrgt., East. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. Louis	33.00 to 33.50
Railroad wrought, No. 2	32.00 to 32.50
Wrought pipe, Buffa.o	27.00 to 28.00
Wrought pipe, East. Pa.	33.00
Wrought pipe, ungraded, East. Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turnings, East. Pa.	24.00
Heaxy axle turnings, Pitts.	24.00
Shafting, New York	35.50
Shafting, East. Pa.	39.00
Steel car axles, Birmingham	38.00 to 40.00
Steel car axles, Pittsburgh	46.50
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, East. Pa.	46.50
Steel car axles, Chicago	46.50
Shafting, St. Louis	38.00 to 39.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels (iron), Pittsburgh	$29.00
Car wheels (steel), Pittsburgh	34.00 to 35.00
Car wheels, East. Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	29.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birmingham	27.00 to 29.00
Cast, No. 1, Birmingham	31.00 to 34.00
Cast No. 1, cupola, East. Pa.	34.00
Cast, No. 1, Cleveland	33.00 to 34.00
Cast, No. 1, Cincinnati	33.00 to 34.00
Cast, 1, heavy, New York	32.25 to 32.50
Cast, 1, machy., New York	32.25 to 32.50
Cast, No. 1, Chicago	34.00
Cast, No. 1, Pittsburgh	32.50 to 33.00
Cast, No. 1, St. Louis	32.00 to 32.50
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleab'e, Pittsburgh	33.00 to 34.00
Malleable, East. Pa.	29.00
Malleable, cupola, East. Pa.	33.00
Malleable, railroad, Chicago	34.00
Malleable, agricultural, Chicago	33.00 to 33.25
Malleable, railroad, St. Louis	32.00 to 32.50
Malleable, agricultural, St. Louis	31.00 to 31.50

MISCELLANEOUS USES

Boiler punchings, Chicago	36.00 to 36.50
Reroll. rails, 5 ft. and over, Pitts.	34.00
Reroll. rails, 5 ft. and over, Chi.	34.00
Reroll. rails, 5 ft. and over, E. Pa.	34.00
Reroll. rails, 5 ft. and over, St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birmingham	37.50 to 38.50
Locomotive tires, Chicago	45.50 to 46.50
Locomotive tires, St. Louis	42.50 to 43.00